Duecanali Series

QUICK GUIDE

Duecanali 1604
Duecanali 1604 DSP+D

Duecanali Series

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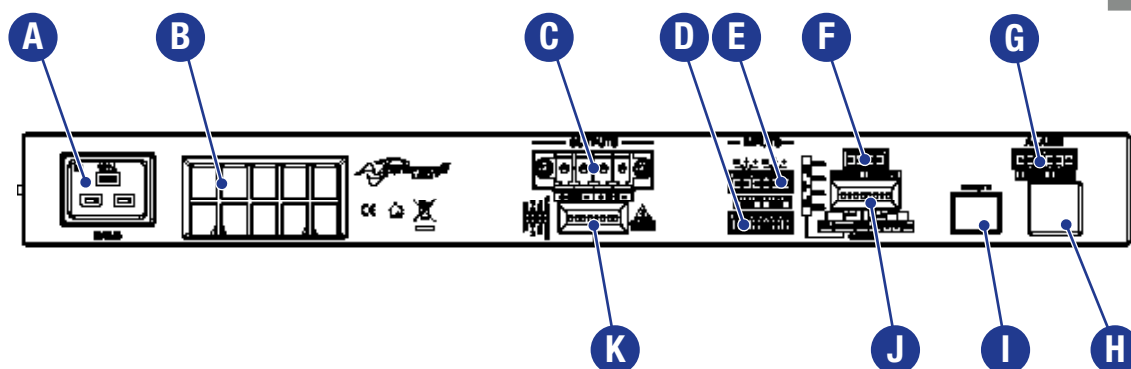
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INPUT
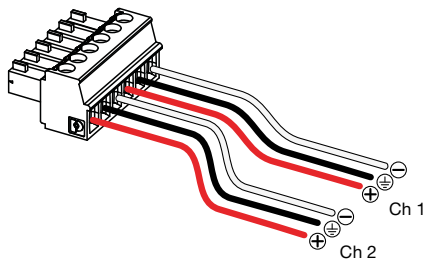
Ch 1

Ch 2

Phoenix MC 1,5/6-ST-3,81 5447900

F

GPO/ALARM

common Ch 1

common Ch 2

Phoenix MC 1,5/6-ST-3,81 5447900

G

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Ch 1
(Or Master)

Ch 2

Phoenix MC 1,5/6-ST-3,81 5447900

H

REMOTE ON | REMOTE OFF

Phoenix MC 1,5/4-ST-3,81 1803594

I

OUTPUT (single ended)

+
− Ch 2

+
− Ch 1
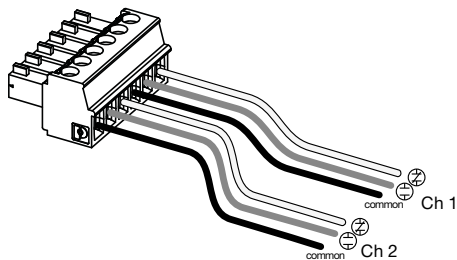
Phoenix PC 5/4-STF1-7,62 177859

J

INPUT (link channel pairs)*
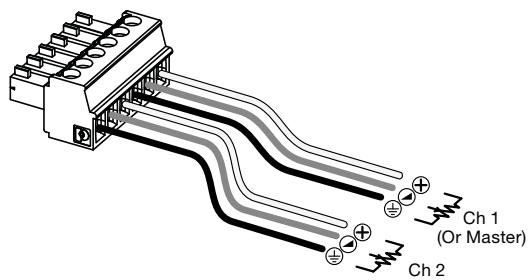
Phoenix MC 1,5/6-ST-3,81 5447900

K

OUTPUT (bridged)

−

+

Phoenix PC 5/4-STF1-7,62 177859
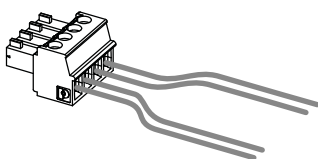
* Duecanali 1604 without DSP only

Bill of connectors

Name	Plug
INPUT	Phoenix MC 1,5/6-ST-3,81 5447900
OUTPUT	Phoenix PC 5/4-STF1-7,62 177859
GPO/ALARM	Phoenix MC 1,5/6-ST-3,81 5447900
REMOTE ON|OFF	Phoenix MC 1,5/4-ST-3,81 1803594
AC MAINS	IEC C19

ground
mains

OUTPUTS

CH2 CH1
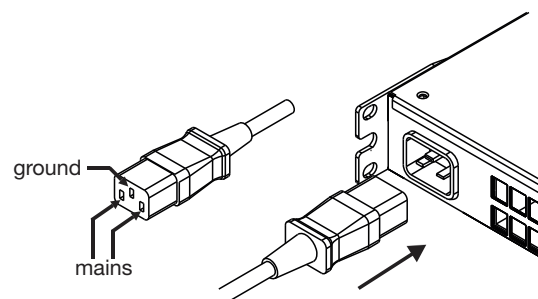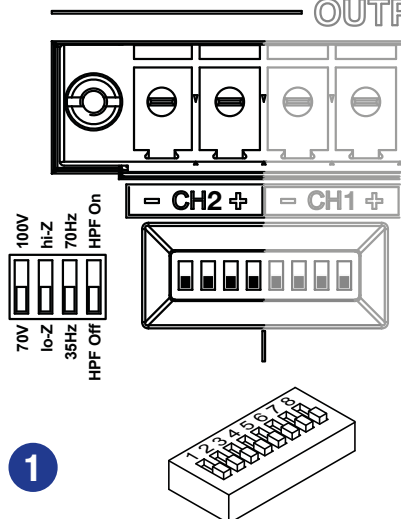
	Low-Z	High-Z	100V	70V	HPF @ 35 Hz	HPF @ 70 Hz
1	•					
2		•	•			
3		•	•		•	
4		•	•			•
5		•		•		
6		•		•	•	
7		•		•		•

100V hi-Z 70Hz HPF On
70V lo-Z 35Hz HPF Off

1

2

3

4

5

6

7

N

Mounting brackets

O

✓	✗ ⊘
1 RU	5
4	4
3	3
2	2
1	1
1 RU	1 RU
4	4
3	3
2	2
1	1

P

RJ45

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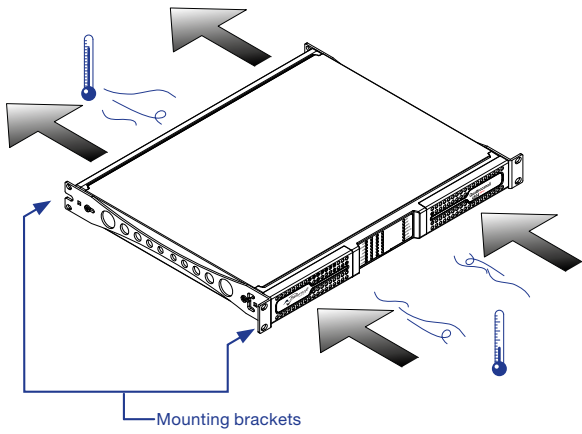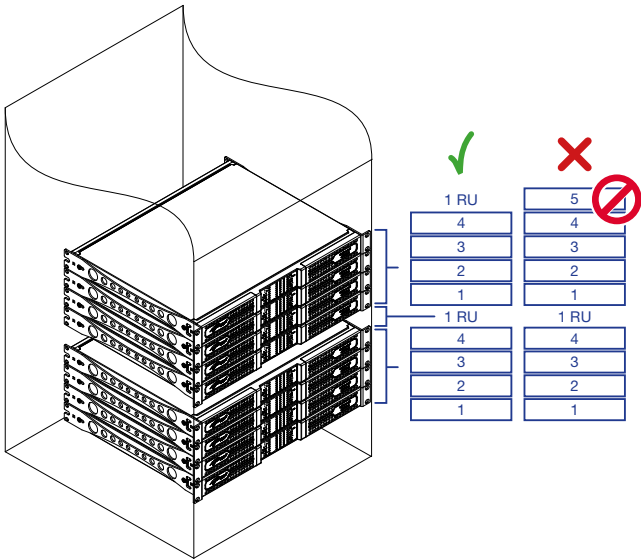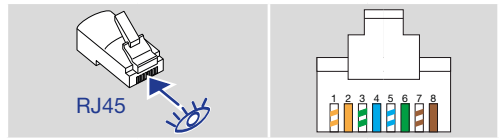
Color code (TIA/EIA-568-B)	Pin
ORANGE / WHITE	1
ORANGE	2
GREEN / WHITE	3
BLUE	4
BLUE / WHITE	5
GREEN	6
BROWN / WHITE	7
BROWN	8

1

WEEE Directive

If the time arises to throw away 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. Powersoft S.p.A. comply with the Directive 2012/19/EU of the European Parliament on waste electrical finance the cost of treatment and recovery of 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, or by returning it to Powersoft S.p.A. for reprocessing. For more information about where you can send your waste equipment for recycling, please contact Powersoft S.p.a. or one of your local distributors.

EC Declaration Of Conformity

Manufacturer:
Powersoft S.p.A.
via E. Conti 5
50018 Scandicci (Fi)
Italy

$C \in$

We declare that under our sole responsibility the products:
Model Names: Duecanali 1604,
                Duecanali 1604 DSP+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
2014/53/EU	Radio Equipment Directive

The following harmonized standards are applied:
EN 55103-1: 2009 /A1: 2012
EN 55103-2: 2009 /IS: 2012
EN 60065: 2014 /AC: 2016

Scandicci,
October 2017

Luca Lastrucci
Managing Director

For compliance questions only: compliance@powersoft.it

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 2012/19/EC of the European Parliament 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 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.

USE ONLY BATTERIES, CHARGERS, AND OTHER ACCESSORIES APPROVED BY POWERSOFT FOR USE WITH THIS DEVICE. PLEASE REALIZE THAT BATTERIES MIGHT CAUSE DAMAGES LIKE LEAKING, FIRE OR EXPLODE WHEN MISUSE OR DEFECTIVE. NEVER MAKE WRONG POLARITY CONNECTION WHEN CHARGING AND DISCHARGING BATTERY PACKS. ALWAYS DOUBLE CHECK POLARITY OF BATTERY'S CONNECTOR TO MAKE SURE RED WIRE TO RED WIRE AND BLACK WIRE TO BLACK WIRE.

FOR SAFETY REASON, WE USUALLY SHIP BATTERY NOT FULLY CHARGED: YOU MUST CHARGE THE BATTERY BEFORE USE.

BATTERIES (BATTERY PACK OR BATTERIES INSTALLED) SHALL NOT BE EXPOSED TO EXCESSIVE HEAT SUCH AS SUNSHINE, FIRE OR THE LIKE.

WARNING TO PREVENT INJURY, THIS APPARATUS MUST BE SECURELY ATTACHED TO THE FLOOR/ WALL IN ACCORDANCE WITH THE INSTALLATION INSTRUCTIONS.

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. 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.
15. The apparatus shall be connected to a MAINS socket outlet with a protective earthing connection
16. Where the MAINS plug or an appropriate coupler is used as the disconnect device, the disconnect device shall remain readily operable.

Duecanali 1604 Series │Quick Guide

2:1.Welcome

Congratulations on buying a Powersoft amplifier!

We know you are eager to use your new Duecanali amplifier, 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 Powersoft.

The Duecanali Series is specifically designed for installation applications. In just 1 RU, Duecanali offers smaller dimensions, lighter weight and the traditionally amazing sound quality and reliability of all Powersoft products.

Duecanali Series amplifiers implement a high efficiency microprocessor controlled power supply with built in PFC (Power Factor Correction) that allows flawless worldwide operation with any AC mains voltage in the range 85-275 V_{AC} tolerant to peak up to 400 V. The patented SRM (Smart Rails Management) technology allows to maximize the efficiency of the system and drastically reduce power consumption at any load and usage condition.

A secondary high efficient power supply is present to keep the system responsive at any operating condition, so that system check and monitoring can be performed even in stand-by and deep-sleep modes.

Duecanali Series is designed to work with lo-Z (from 2 Ω) and with 70V/100V distributed lines: any mixed configuration of low and high impedance output loads can be realized, making the Duecanali Series suitable to all application in installed sound reinforcement system.

DSP+D versions of the Duecanali 1604 extend system performance with the support to Dante™ digital audio networking architecture and the on board high-end signal processing.

	8 Ω	4 Ω	2 Ω	Hi-Z 70 V	Hi-Z 100 V
1604	800 W	800 W	1000 W	800 W	800 W

2:2.Unpacking & checking for shipping damage

Your Powersoft amplifier 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 retailer immediately.

The box contains the following:
▶ 1x Duecanali 1604 Series amplifier.
▶ 1x Phoenix MC 1,5/ 4-ST-3,81 - 1803594 plug
▶ 2x Phoenix MC 1,5/6-ST-3,81 - 5447900 plug
▶ 1x Phoenix PC 5/ 4-STF1-7,62 - 177859 plug
▶ 1x IEC power cord
▶ 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. Mechanical drawings: all dimensions in millimeters
B. Front panel: how to access it
C. Duecanali Series: Front panel description
D. Duecanali Series: Rear panel description
E. Duecanali Series DSP+D: Front panel description
F. Duecanali Series DSP+D: Rear panel description
G. Input connector: wiring (single ended mode)
H. Output connector: wiring (single ended mode)
I. Alarms connector: wiring
J. Input/Output connectors: wiring (bridged mode)
K. Output load DIP switch configurations
L. RJ45 Ethernet wiring (Color code TIA/EIA-568-B)
M. Air flow and mounting brackets
N. Rack mounting constraints
O. Regulatory information

Installation

3

3:1.Location

Duecanali Series amplifiers are meant to be installed into rack cabinets. In order to limit the risk of mechanical damages, the amplifiers must be secured 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.

The AC mains connector of the units must be connected to a proper circuit breaker.

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 Powersoft 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 heat sink 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 minimum.

Should however the amplifier be subject to an extreme thermal load, the fans 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.

Duecanali 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 to guarantee adequate air flow (see).

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.
1. Firmly grip the outermost silver panel and pull it outwards (see).
2. When the front panel is removed, the air filter (looking like a shiny black plastic sponge) will be exposed.

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 prior to reassembly.

3:4.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 a rack cabinet.

▶ A sectioning breaker between the mains connections and the amplifier should be installed inside the rack cabinet.

▶ Properly fit the AC mains plug 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 requirement of safety and, in case of doubt, require an accurate check by qualified personnel.

3:5. AC mains supply

Duecanali Series amplifiers implement an 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 is in the rear panel through the IEC C20 inlet: the approved power cord is provided (see Panel K, p. 7).

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

⚠️ **This device must be powered exclusively by earth connected mains sockets in electrical networks compliant to the IEC 364 or similar rules.** ⚠️

⚠️ **Powersoft suggests to plug the Duecanali to a 16 A rating, C or D curve, 10 kA sectioning breaker.** ⚠️

3:7. Energy save

The Smart Rails Management technology implemented in the power supply unit allows to reduce the power consumption when the input signal falls under a defined threshold.

Signal activity is monitored on the input section of the amplifier so that the system can resume normal operation in a matter of milliseconds when an incoming signal is detected on the channels. Once switched on, Energy Save is active on each channel independently.

If the signal is missing for more than 30 minutes on all channels, the auto standby is applied and the main PSU is turned off to further save energy*. Normal operation is resumed in a matter of milliseconds when an incoming signal is detected on the channels.

In order to activate the Energy Save feature, locate the NRG SAVE switch on the rear panel (see Panel D, p. 5) and set it ON (high).

TAB. 1 shows the power consumption in idle mode when the Energy save is either enabled or disabled.

Energy Save		115 V_{AC} mains			230 V_{AC} mains		
		Current	Real Power	Apparent Power	Current	Real Power	Apparent Power
1604	OFF	0.24 A	14 W	28 VA	0.18 A	14 W	42 VA
	AUTOSTBY	0.24 A	14 W	28 VA	0.18 A	14 W	42 VA
1604 DSP+D	OFF	0.27 A	15 W	32 VA	0.2 A	15 W	44 VA
	AUTOSTBY	0.27 A	15 W	32 VA	0.2 A	15 W	44 VA

TAB. 1: Idle consumption.

3:8. Breaker save

In case the power grid is unable to provide enough current to continuously drive the loads, or when the number of attached amplifier to the same AC mains is such that one can reach the critical power absorption from the line, it is possible to activate the Breaker Save feature.

When activated, the Breaker Save feature reduces (halves) the maximum continuous current absorption from the mains. This slightly reflects on the overall performance

*Time out time is selectable via Armonìa in DSP+D Versions

of the system reducing the available output power.

In order to activate the Breaker Save feature, locate the BRK SAVE switch on the rear panel (see Panel D, p. 5) and set it ON (high).

3:6. Switch ON/OFF

Once properly powered (power cord inserted, sectioning breaker closed), the system can be either ON or in STANDBY mode depending on its state at latest power off.

In order to toggle the amplifier ON and STANDBY keep pressed the power button for 3 seconds (see Panel C, p. 5). Please consider that the operating condition can be modified by the REMOTE ON and REMOTE OFF configuration (see §3:9. Remote ON/OFF (standby mode)).
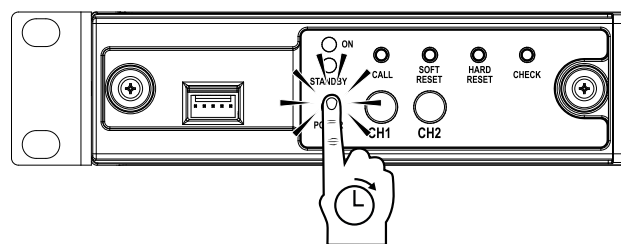
FIG. 1: Keep pressed the power pushbutton to toggle ON/STANDBY the amplifier.

3:9. Remote ON/OFF (standby mode)

Remote ON/OFF is available through the dedicated terminals on the rear panel (see Panel C, p. 5).

Both terminals respond to the differential voltage between the contacts: a voltage difference in the range $5 V_{DC}$ - $24 V_{DC}$ triggers the control. Any voltage exceeding $28 V_{DC}$ may damage the input circuitry.

The couple of terminals act depending on the actual state of the amplifier, as shown in .

REMOTE ON	REMOTE OFF	AMPLIFIER STATE
Vdiff ≥ 5V	Any	Force Turn ON
Vdiff < 3V	Vdiff ≥ 5V	Force Turn OFF
Vdiff < 3V	Vdiff < 3V	No Change (Keep either standby or in current state)

In order to remotely toggle between standard operating and standby modes, the AC mains power must be connected.

Connections

4

Make sure the external breaker is off before attempting to make any input or output connections.

By using good quality input and output 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 Duecanali 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 connections are made via the Phoenix MC 1,5/6-ST-3,81 5447900 connector. Signal polarity of analog input connections is shown in Panel E, p. 6.

4:2.1. Remote level adjustment

The level of each channel of the Duecanali Series amplifiers can be remotely adjusted by means of a linear 10 kΩ potentiometer connected to the input LEVEL connector (see Panel D, p. 5) through a Phoenix MC 1,5/6-ST-3,81 5447900 plug. The right polarity for the connections is shown in Panel G, p. 6.

When the CH1 MSTR switch is in the OFF position (low) the remote level potentiometers work independently on each separate channel,

When the CH1 MSTR switch is in the ON position (high) the remote level potentiometer of the channel 1 acts as a master level, controlling the volume of both channels.

The remote level controls are in series with the level adjustment knobs in the front panel.

4:3. Digital audio input connections

The Dante equipped models of Duecanali DSP+D accepts two input streams from the Dante connection through the Dante port. Cabling must comply to TIA/EIA-568-B and adopt the T568B scheme pinout, as shown in Panel O, p. 8.

In order to implement a Dante network, a computer running Dante Controller have to be used. Dante Controller is a software application that manages devices on the network. Duecanali DSP+D amplifiers are automatically discovered and displayed in Dante Controller with the default identifier *MODELNAME-SERIAL* (e.g. Duecanali1604-71520).

4:3.1. Input selection and Backup policy

In Duecanali DSP+D amplifiers it is possible to select among two input signal sources per channel: analog and Dante streams. The Armonía Pro Audio Suite software provides an interface to select the proper input source, manage input gain and delay of the analog and digital sources, in order to compensate transmission latency and levels.

Furthermore Duecanali DSP+D amplifiers implement a backup policy aimed to improve reliability against signal fault. By assigning a bus priority to the two different input sources per channel, the system is able to automatically switch to a reliable input connection in case of signal drop or pilot tone mismatch.

4:4. Ethernet connections

The port labeled Ethernet is designed to remotely control the Duecanali DSP+D via an Ethernet connection through a personal computer and Powersoft Armonía Pro Audio Suite software. A complete interface for signal routing, sound shaping and performance fine tuning is provided.

Powersoft recommend the use of Ethernet Cat5 straight through – *patch* – cables with pin/pair assignments TIA/EIA-568-B, i.e. T568B, as shown in Panel O, p. 8.

4:5. Output connections

⚠ **CLASS 3 WIRING**
CLASS3 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 terminal before switching the device on.

Output connections are made via the Phoenix PC 5/4-STF1-7,62 177859: single-ended wirings for lo-Z loudspeaker and Hi-Z distributed lines connections are shown in Panel I, p. 6. Bridge-tied connection of lo-Z loudspeaker is supported on adjacent channel pairs 1-2; inputs must be physically paralleled as shown in Panel J, p. 6.

Any mixed configuration of low and high impedance output loads can be made: in order to set the load configuration, each channel is provided by four DIP switches (refer to Panel L, p. 7). Duecanali Series is configured to drive Lo-Z loads by factory default.

4:5.1. Hi-Z 70V/100V operations

Any channel of an Duecanali Series amplifier can drive 70V/100V (Hi-Z) distributed line of loudspeakers. In order to connect any channel's output to a 70V/100V line, the rear panel DIP switch corresponding to the channel must be correctly set as indicated in Panel L, p. 7.

Powersoft recommends to use the built-in HPF (High Pass Filter) when the amplifier is set to drive a distributed line to prevent loudspeaker transformer saturation which can considerably degrade sound performance. The HPF can be activated by means of the DIP switch corresponding to the channel (see Panel L, p. 7), two cutting frequency are available 35 Hz and 70 Hz.

4:6. Gain selection

The Duecanali Series amplifiers can operate with different gain applied to the input signal. This feature is designed to match the voltage of the input signal, i.e. allowing to obtain the same output power at different input levels.

	GAIN	Input sensitivity @ 8Ω load		
		Vpeak	Vrms	dBu
1604	26	5.7	4.0	14.2
	29	4.0	2.9	11.2
	32	2.9	2.0	8.2
	35	2.0	1.4	5.2

TAB. 2: Input sensitivity.

A proper combination of the position of two GAIN switches on the rear panel sets the operating gain of the amplifier (see TAB. 3)

26 dB	29 dB	32 dB	35 dB
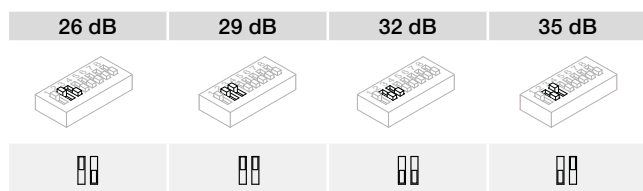
TAB. 3: Setting the GAIN.

4:7. Lo-Z 2Ω load operation

The Duecanali Series amplifiers are optimized for working with 4Ω output loads but a special configuration allows to connect low loads down to 2Ω (e.g. in the configuration with three paralleled 8Ω loudspeakers that provides 2.67Ω load to the output channel).

The 2Ω switch (see Panel D, p. 5) allows to activate on all output channels set to match low impedance (i.e. in Lo-Z configuration) an operating condition that optimizes the performance with very low loads, by limiting the maximum output voltage to 85 V_{peak} per channel.

For optimal 2Ω performance, it is recommended to select LowZ mode for all the amplifier's channels

4:8. Diagnostics - GPO - Alarms

The Duecanali's GPO – general purpose output – system implements triggering signals to broadcast alarms.

Duecanali Series provides a pair of paralleled general purpose output connections per channel: one Normally Open ⊕ NO and one Normally Closed ⊘ NC.

The connections are available on the back panel via the 6-pin Phoenix MC 1.5/6-ST-3.81 5447900 connector: see Panel F, p. 6 for wirings.

These contacts are used to report potentially dangerous faults or generally unsafe operation conditions by toggling alarm switches relative to the following events, and any fault preventing the normal operation of an output channel:
- ▶ No AC mains (i.e. system shutdown);
- ▶ Thermal stress: the system temperature is too high and the thermal protection is engaged;
- ▶ Short circuit in output wiring: either the loudspeaker or the line is in short;
- ▶ Amplifier is in Standby

Duecanali DSP+D features further monitoring on pilot tone and output load: the monitoring and diagnostic interface is accessible in Armonía Pro Audio Suite software through the Diagnostic tab in the output ways panel of the selected channel of the Duecanali DSP+D amplifier.
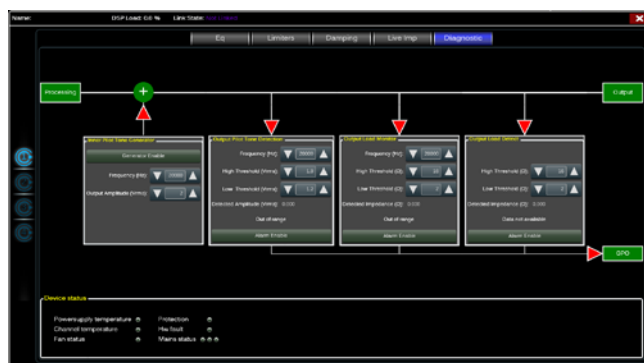
FIG. 2: Diagnostic panel in Armonía Pro Audio Suite.

4:8.1. Pilot tone monitoring

Thanks to the built-in DSP, the Duecanali DSP+D amplifiers implement pilot tone detection and alert. Detecting and alerting features are available for both input and output pilot tones on each channel.

The detection of a mismatch in the input pilot tone parameters (frequency and voltage level) can be used to trigger the backup policy and activate an alert through the general purpose output switch.

The output pilot tone detection relies on an external signal passing through the amplifier or the internal post DSP pilot tone generator; in both cases any mismatch between the detected signal and the set thresholds triggers the general purpose output switches.

4:8.2. Output load monitoring

Through the Armonía Pro Audio Suite software it is possible to set the thresholds on the load impedance, at given frequency, that trigger the general purpose output of any channel in Duecanali DSP+D amplifiers.

LED chart 5

The front LED panel of the Duecanali includes two LED bars for output signal metering and one LED strip with status indicators. Two operating mode LEDs are located on the control panel under the left hand cover.

## 5:1.LED bars: signal metering

The two left hand LED bars provide signal metering and channel status for channels 1 and 2 left to right.

Color		Signal metering	Warnings	
			Lighting	Description
🟠	ORANGE	Clipping *DSP+D User Limiter	–	–
🟡	YELLOW	-6dB	SOLID ON	Thermal warning Thermal protection engaged
			FLASHING	Auto Standby
🟢	GREEN	-12dB	–	–
🟢	GREEN	-24dB	–	–
🟢	GREEN	-60dB	SOLID ON	Signal presence
			BLINKING	Channel muted
🟢	GREEN	–	SOLID ON	Channel ready
🔴	RED	–	SOLID ON	Channel fault[1]

[1] Red LED lights on in case of any kind of channel fault that prevents the normal channel operating; at the same time the rear corresponding GPO toggles the contacts NO into NC and NC into NO.

5:2.LED strip: system status

The right hand LED strip on the LED panel provides system status informations.

Color		Name	Warnings	
			Lighting	Description
🟠	ORANGE	LIMIT	FLASHING	Breaker Save Enabled
			SOLID ON	Breaker Save limiting power draw
🟡	YELLOW	TEMP	SOLID ON	Thermal warning Thermal protection engaged
🟠	ORANGE	CHECK	SOLID ON	System self checking
			BLINKING	Self check completed
			FAST BLINKING	Self Check Unavailable
🟢	GREEN	REMOTE	FLASHING	Network connection presence
			SOLID ON	Connected to Armonía Pro Audio
🟢	GREEN	POWER ON	SOLID ON	System ready
			OFF	System off
🟢	GREEN	MAINS	SOLID ON	AC mains voltage within the operating range
			OFF	Undervoltage
			FLASHING	Over/Undervoltage Warning
			FAST BLINKING	Overvoltage
			SLOW BLINKING	Mains FUSES blown
🔴	RED	ALARM	SOLID ON	PSU fault[1] OR Critical Faults

[1] Red LED lights on in case of any kind of PSU fault that prevents normal operating.

5:3.Operating mode LEDs

The operating mode LEDs are located on the control panel. They state the operating mode when the system either is on or in standby mode.

Color		Name	Operating mode	
			Standby	Power on
🟢	GREEN	POWER ON	–	SOLID ON
🟠	ORANGE	STANDBY	SOLID ON	–
🟠	ORANGE	AUTO STANDBY	BLINKING	–
🟠	ORANGE	ERROR CODE	BLINK COUNTER	–

Control Panel 6

The control panel is located under the left hand metal cover. See Panel B, p. 4 on how to access the control panel.

The control panel contains two LEDs (for the description see §5:3.Operating mode LEDs) and the following controls.

The push-buttons are disabled when connected to Armonìa.

Label	Type	Action	Description
POWER	Pushbutton	keep pressed for 3 seconds	Toggle system ready/standby mode
CALL	Pushbutton	press	Highlight the amplifier in the Armonía workspace
SOFT RESET[1]	Pushbutton	keep pressed for 3 seconds	Reset network parameters to factory default
HARD RESET[1]	Pushbutton	keep pressed for 3 seconds	Reboot the system
CHECK[2]	Pushbutton	keep pressed for 3 seconds	Start the self-checking procedure*
CH1[3]	Potentiometer	turn counter-clockwise	Attenuate the output level of the signal on channel 1
CH2[3]	Potentiometer	turn counter-clockwise	Attenuate the output level of the signal on channel 2

1. Keep pressed both the SOFT RESET button and the HARD RESET button for at least 3 seconds to completely reset the amplifier to its factory default configuration (any preset stored in the internal memory will be lost and replaced with a flat preset).
2. For further information see §6:1. Self check.
3. The potentiometer is in series with the remote level control (see §4:2.1. Remote level adjustment) so it can be used to limit the output volume regardless to any remote adjustment.
* Press again to resume normal operations

6:1.Self check

The self check procedure tests the amplifier status and reports the user in case of failures.

⚡ ⚠️ **It is highly recommended to unplug the output connectors before proceeding with the self check procedure**

⚡ ⚠️ **The testing signals might cause loudspeaker impairments.**

After few minutes, at the end of the self check procedure, a combination of lighten LED in the LED panel provide information about the amplifier status.

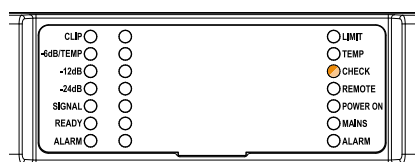In order to exit the self check test and resume normal operations, press once the self check push button.

FIG. 3:
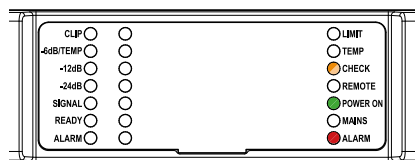*System OK.*
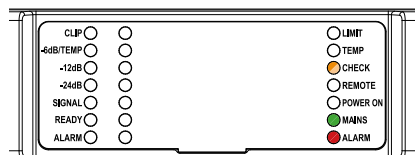
6:1.1. Global faults

FIG. 4:
Power supply fault

FIG. 5:
AC Mains voltage out of range (over/under voltage)
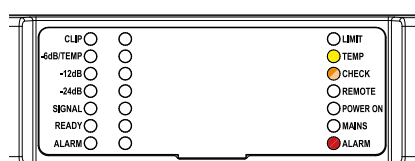

FIG. 6:
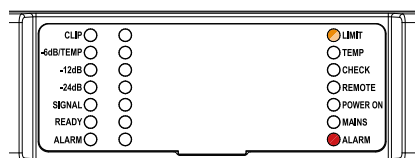*PSU temperature out of range*

FIG. 7:
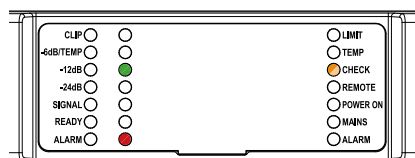*Fan Error*

6:1.2. Channel faults

FIG. 8:
Channel# Output Waveform non-conformity

FIG. 9:
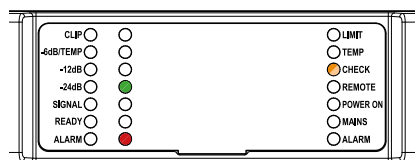*Channel# Temperature out of range*

FIG. 10:
Channel# Output current measurement non-conformity[1]

1. An 8Ω dummy load is needed to measure the output current. If the dummy load is not applied the system reports a fault.

If self check cannot be started because of a fault, the check LED will blink fast, whilst a reassuring slow blink is an indication of a completed self check procedure.

Networking

7

Duecanali amplifiers support star network topology via the Ethernet port and Dante networking via the Dante port only.

The Ethernet port is designed to allow the remote control of the amplifier through Armonía Pro Audio Suite and third party software. The Dante port is reserved to Dante networking.

7:1. IP addressing

Factory default network settings are DHCP/AutoIP, in order for the amplifier to self-configure when connected to an existing LAN or PC. Fixed IP policy can also be adopted and configured through Armonía Pro Audio Suite.

If a DHCP server is not active within the network, the amplifier platform initiates a stateless address auto-configuration (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 host names of the networking devices. For setting a static IP address please refer to the Armonía Pro Audio Suite user guide.

7:1.1. IP Addressing troubleshooting

When connecting the Duecanali to a network environment it may happen that Armonía Pro Audio Suite does not discover or import the amplifier.

Usually this is a problem of IP addressing: both Armonia and the Duecanali must belong to the same subnet. If a DHCP server is present on the network and a Duecanali amplifier 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 Duecanali amplifier is established during the bootstrap: when the amplifier discovers a DHCP server on the network during the startup, it negotiates the networking parameters. If the Duecanali does not reveal a DHCP server on the network during the startup, it set itself in AUTO IP mode.

Armonía Pro Audio Suite

8

Armonía Pro Audio Suite is the default configuring interface that allows system setting and customization of the Duecanali DSP+D amplifiers.

Armonía can be installed on a PC running Windows (XP SP3 and higher). Freely download Armonía Pro Audio Suite from the Armonía forum:

http://www.powersoft-audio.com/en/armonia-forum

Duecanali DSP+D amplifiers can connect to the PC running Armonía through a Fast Ethernet connection. In order to start remote operation the device must be discovered and imported into the Armonía Workspace. Click on the **Discover** button in the **Remote entities** window, or select it from the **Model list** and drag it into the Armonía **Workspace**.

The callback button (see Panel C, p. 5) allows you to highlight the presence of the amplifier into the Armonía Workspace.

Once connected to Armonía Pro Audio Suite a double click on the amplifier icon in the Workspace will open the amplifier dashboard. Here it is possible to access and configure all the features of the Duecanali DSP+D.

8:1.Signal routing and DSP architecture

Signal processing on Powersoft Duecanali DSP+D amplifiers accomplishes multiple functions that affect the audio signal before power amplification; the main adjustments include gain, polarity, delay, limiting and signal equalization; some processing are related only to particular stages, such as limiting and damping control that are implemented on 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 Duecanali DSP+D implement a backup policy aimed to improve reliability against signal fault.
▶ Matrix. The innovative routing engine of Duecanali DSP+D allows any input to be routed to any output. The Matrix implements a non-boolean rooting architecture allowing free channel assignment and level adjustment.

FIG. 11: Armonía Pro Audio Suite.

▶ Advanced processing. This allows you to optimize levels and shape the sound of the input signals. Gain and polarity adjustment, asymmetric raised-cosine 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 the power delivered and the performance of the single way out. 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 goes up toward the input selection and the definition of the backup policy.

Shortly, the main steps to follow are:

1. Set Lo-Z and Hi-Z loads and filters on output channels.

2. Load the loudspeaker presets or manually configure the loudspeaker layout (grouping output channels, limiting, speaker processing, etc.).

3. Define the routing path and the levels of the signals from the input channels to the active output channels (matrix).

4. Select the signal source from the input connections and define the backup policy (input source selection).

5. Define GPO assignment and alarms thresholds.

8:3.Live Impedance

Through Armonía Pro Audio Suite software it is possible to set the thresholds on the load impedance, at given frequency, that trigger the general purpose output of any channel in Duecanali DSP+D amplifiers (see FIG. 5).
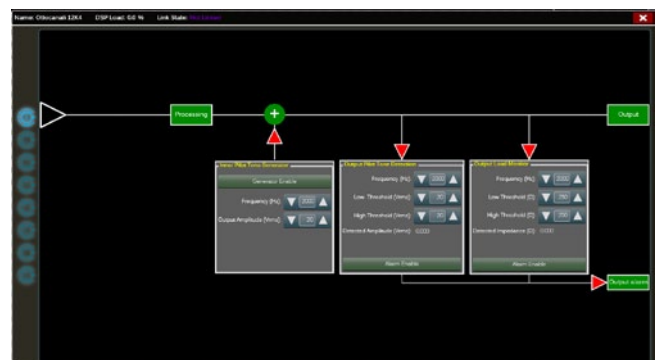

FIG. 12: GPO: System monitoring interface.

The row of potentiometers in the front panel behave differently on non-DSP amplifiers and Duecanali DSP+D amplifiers:

- ▶ In non-DSP Duecanali amplifiers, the potentiometers act as trimmers on the input level (see Panel C, p. 4): the input signal is muted when the trimmer is completely turned counterclockwise; on the other hand, no attenuation is applied when the trimmer is completely turned clockwise.

- ▶ In Duecanali DSP+D the potentiometers attenuate the speakers gain (see Panel E, p. 6): they modify the overall gain applied to the group of ways belonging to the selected speaker. The amount of gain attenuation (External gain) is shown in Armonía Pro Audio Suite.

Warranty and assistance

9

9:1. Warranty

Powersoft guarantees its manufactured products to be free from defective components and factory workmanship for a period of time starting from the date of purchase printed on Powersoft's (or any of its Authorized Dealer's) invoice to the end customer. The standard warranty period are:
- ▷ 48 months for racks amplifiers.
- ▷ 12 month for amplifier modules.

All warranty repairs and retrofits must be performed at Powersoft facilities or at an Authorized Service Center at no cost for the purchaser. Warranty exclusion: Powersoft's warranty does not cover product malfunctioning or failure caused by: misuse, abuse, repair work or alterations performed by non-authorized personnel, incorrect connections, exposure to harsh weather conditions, mechanical damages (including shipping accidents), and normal wear and tear. Powersoft will perform warranty services provided that the product is not damaged during transportation.

9:1.1. Return of Goods

Goods can be returned to Powersoft only after they have been granted a Return Merchandise Authorization (RMA) number to be attached to the external packaging. Powersoft (or its Authorized Service Center) has the right to refuse any returned good without a RMA number.

9:1.2. Repair or replacement

Powersoft reserves the right to repair or replace any defective goods covered by product warranty at its sole discretion and as it deems best.

9:1.3. Cost and responsibility of transport

The purchaser (or end user/customer) is solely responsible for all transportation costs and risks associated with sending warranty covered goods to Powersoft or its Authorized Service Center. Powersoft will assume full responsibility and cover all costs incurred to send the goods back to the purchaser (or end user/customer).

9:2. Assistance

There are no user-serviceable parts in the amplifier. Refer to qualified technical personnel for servicing. In addition to having an in-house service department, Powersoft supports a network of Authorized Service Centers. If your amplifier needs repair, contact your Powersoft dealer (or distributor). You can also contact the Powersoft Technical Service department to obtain the location of the nearest Authorized Service Center.

Powersoft offers two options for product repair:
- ▶ Drop off at a Powersoft Authorized Service Centre near you.
- ▶ Ship the product to Powersoft S.p.a. for Factory Service.

9:2.1. Drop off at a Powersoft Authorized Service Centre near you

- ▶ Find a Powersoft Authorized Service Centre from the list.
- ▶ Take a note of each serial number of the units to be returned.
- ▶ Completely fill out the defect report form for each unit to be returned.
- ▶ Send the completed defect report form to the following e-mail addresses marco.mannucci@powersoft.it (Customer care manager) service@powersoft.it (Service Team).

After having applied the aforementioned procedure, the local service manager will provide the shipment details and the product's warranty status.

9:2.1.1. In-Warranty repairs:

The service repair will be free of charge for the customer.

9:2.1.2. Out of Warranty Issues

- ▶ The service costs are calculated on the local rate applied from the service centre and supervised by the Powersoft HQ
- ▶ The repair time has been set from the Powersoft HQ and it's equally applied in all the authorized service centre
- ▶ The unit will be evaluated by a technician, and the service centre will provide the customer with the estimated costs. The repair will only take place once the customer has approved the estimated costs. The customer will pay the shipping charges once the repair has been completed, depending on the countries' standard procedures.

For any enquiries please contact Powersoft Customer care service@powersoft.it

9:2.2.Shipping the product to Powersoft S.p.a. for Factory service centre

▶ Take a note of each serial number of the units to be returned.

▶ Fill out completely the defect report form for each unit to be returned.

▶ Send the completed defect report form to the following email address:
service@powersoft.it

After having applied the aforementioned procedure, you will receive an Email containing the Return Merchandise Authorization (RMA form) for each unit returned.

All returned Powersoft units must be shipped to the following address:

Powersoft spa
Factory service centre
Via Enrico Conti N. 13 – 15
50018 Scandicci (FI)
Italy
Phone +39 (055) 7350230 Option 2
Email: service@powersoft.it

Contact Powersoft Factory service centre
Phone +39 (055) 7350230 Option 2
Email: service@powersoft.it

Phone Support Hours
Monday - Friday 8.30 AM to 5.30 PM Europe time

9:2.2.1.Shipment from NON-CE countries

When shipping from non-CE (European Community) countries, follow the procedure described in the TEMPORARY EXPORTATION / IMPORTATION PROCEDURE.

Important Note:
If the RMA# is not displayed anywhere on the outside of the box, the shipment will be rejected and sent back to the customer.

If the returned goods from NON-CE countries do not follow the aforementioned guidelines, the package will be rejected and sent back to the customer.

9:2.3.D.O.A. Procedure

In case of a D.O.A. (Dead On Arrival) product, we kindly request the customer to contact the local dealer where the product was purchased or the Factory service centre, mentioning the serial number of the faulty unit.

D.O.A. unit will be replaced completely without any additional charges!

Important Note: Do not tamper with or operate the D.O.A. unit in any ways in order to avoid any warranty issue.

Powersoft S.p.a declines any D.O.A warranty service if the returned unit has been tampered with or misused by the customer.

Specifications
Duecanali 1604
Duecanali 1604 DSP+D

Channel Handling

Number of output channels	2 Hi-Z or Lo-Z (bridgeable per ch. pair)	Phoenix PC 5/8-STF1-7,62
Number of input channels		
Analog	2	Phoenix MC 1,5/12-ST-3,81
Dante™*	2	1 x RJ45

Audio

Gain	26 dB	29 dB	32 dB	35 dB
Input sensitivity @ 8 Ω	4.0 V$_{rms}$	2.84 V$_{rms}$	2.0 V$_{rms}$	1.42 V$_{rms}$
Max input level	20 dBu			
Frequency Response (±0.5 dB , 1 W @ 8 Ω)	20 Hz - 20 kHz			
Crosstalk (1 kHz)	typical -70 dB			
S/N (20 Hz - 20 kHz A-Weighted @ 8 Ω)	> 109 dB			
Input impedance	20 kΩ balanced			
THD+N (from 0.1 W to Full Power)	< 0.1% (typical < 0.05%)			
DIM (from 0.1 W to Full Power)	< 0.05%			
Slew Rate (input filter bypassed @ 8 Ω)	> 50 V/µs			
Damping Factor @ 8 Ω, 20 Hz - 100 Hz	> 500			

DSP*

AD converters	24 Bit Tandem™ @ 48 kHz 125 dB-A Dynamic Range - 0.005 % THD+N
DA converters	24 Bit Tandem™ @ 48 kHz 117 dB-A Dynamic Range - 0.003 % THD+N
Sample rate converter	24 Bit @ 44.1 kHz to 192 kHz 140 dB Dynamic Range - 0.0001 % THD+N
Internal precision	32 bit floating point
Latency	2.5 ms fixed latency architecture
Memory/Presets	128 MB (RAM) plus 512 MB flash for presets
Delay	2 s (input) + 100 ms (output) for time alignment
Equalizer	Raised-cosine, custom FIR, parametric IIR: peaking, hi/lo-shelving, all-pass, band-pass, band-stop, hi/lo-pass
Crossover	linear phase (FIR), hybrid (FIR-IIR), Butterworth, Linkwitz-Riley, Bessel: 6 dB/oct to 48 dB/oct (IIR)
Limiters	TruePower™, RMS voltage, RMS current, Peak limiter
Damping control	Active DampingControl™ and LiveImpedance™ measurement

Networking

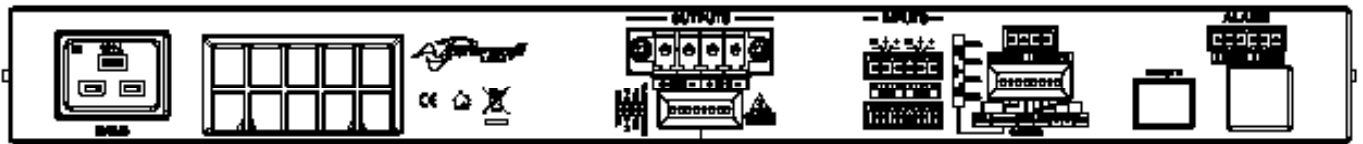|	
Standards compliance	auto-sensing Fast Ethernet (IEEE 802.3u, 100 Mbit/s)
Supported topologies	Star
Remote interface	Armonía Pro Audio Suite™

Output Stage

Maximum output power per channel @ 8 Ω	800 W
Maximum output power per channel @ 4 Ω	800 W
Maximum output power per channel @ 2 Ω	1000 W
Maximum output power @ 4 Ω Bridged	2000 W
Maximum output power @ 8 Ω Bridged	1600 W
Maximum output power @ Hi-Z distributed line 100 V	800 W
Maximum output power @ Hi-Z distributed line 70 V	800 W
Maximum unclipped output voltage @ 8 Ω	115 V$_{peak}$
Maximum output current	45 A$_{peak}$

The power figure is calculated by driving and loading symmetrically all the channels: uneven loads allow to achieve higher performances.

AC Mains Power

Power supply	Universal input, regulated output, PFC, overvoltage tolerant, SRM			
Nominal voltage (±10%)	100-240 V @ 50-60Hz			
Power factor (> 500 W ouput)	> 0.95			
Consumption/current draw	@ 115 V		@ 230 V	
Idle	23.1 W	0.40 A	24 W	0.28 A
Idle (DSP+D)	25 W	0.45 A	25.9 W	0.29 A
1/8 Max Output Power @ 4 Ω	258.4 W	2.7 A	285.3 W	1.78 A
1/4 Max Output Power @ 4 Ω	554.4 W	5.24 A	549.2 W	2.84 A
AC Mains connector	IEC C20 inlet (20 A max) region-specific power cord provided			

Thermal

Operating temperature	-10° - 35° C / 14° - 95° F			
Cooling	Low noise fan, continuously variable speed, temperature controlled, front to rear airflow			
Thermal dissipation	@ 115 V		@ 230 V	
Idle	78.9 BTU/h	19.9 kcal/h	81.9 BTU/h	20.6 kcal/h
Idle (DSP +D)	85.4 BTU/h	21.53 kcal/h	88.4 BTU/h	22.3 kcal/h
1/8 Max Output Power @ 4 Ω	291.6 BTU/h	73.5 kcal/h	291.2 BTU/h	73.4 kcal/h
1/4 Max Output Power @ 4 Ω	527.1 BTU/h	132.9 kcal/h	509.4 BTU/h	128.4 kcal/h

Construction

Dimensions	483 x 44.5 x 358 mm 19.0 x 1.75 x 14.1 in
Weight	7 Kg (15.4 lb)