ORIGINAL INSTRUCTIONS
Usage and programming

CTSjunior
Digital power mixer

owner's manual (EN)

Digital power mixer

The CTSjunior owner's manual is intended for all actors involved in the system design, implementation, preventive and corrective maintenance of the CTSjunior product.

It must be used as follows:
1. Read the technical description for an overview of all product elements, their features, and their
compatibilities. • **Technical description (p.12)**
2. Before installing the product, perform mandatory inspections and functional checks.
• **Inspection and preventive maintenance (p.17)**
3. To deploy the product, follow the step-by-step installation instructions and refer to the cabling schemes.
• **Installation (p.19)**
• **Audio and network cabling (p.23)**

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Important safety instructions

Inspect the product before operation.
If any sign of defect or damage is detected, immediately withdraw the product from use for maintenance.

Perform preventive maintenance at least once a year.
Refer to the preventive maintenance section for a list of actions and their periodicity. Insufficient upkeep of the product can void the warranty.

Verify the electrical conformity and compatibility of the mains supply.
Only connect the product to an AC power outlet rated 100-240 V, 50-60 Hz, with the following current values:
100 V (Japan): 5 A
120 V (North America): 4 A
220-240 V (EU): 2 A
WARNING: The product is of Class I construction and shall be connected to a mains socket outlet with a Protective Earth connection.

When the product is used in a three-phase circuit, verify the electrical conformity and compatibility of the three-phase circuit.
Verify that the three phases work, and balance the loads between the three phases.
Verify that the neutral and earth work.
Never try to emulate a 230 V circuit connecting an apparatus to two live wires of a 120 V three-phase circuit.
Never try to emulate a 200 V circuit connecting an apparatus to two live wires of a 100 V three-phase circuit.

Always interconnect a circuit breaker between the product and the mains supply.
Use the following references or equipment with equivalent ratings:
100 V (Japan): 10 A
120 V (North America): 6.3 A
220-240 V (EU): 6.3 A Type B

Electrical generator
You must power on the generator before powering on the product.

Terminals marked with the lightning flash symbol are HAZARDOUS LIVE.
The external wiring connected to these **terminals** requires installation by an **instructed person** or the use of ready-made leads or cords.
Never attempt to touch any exposed speaker wiring while the product is operating: first disconnect the connector from the product.
Mute all output channels before connecting a speaker to an amplified controller.
Do not connect a speaker output in parallel or series with any output of another amplified controller.
Do not connect the speaker outputs to any other voltage source, such as a battery, power mains, or power supply, regardless of whether the amplified controller is turned on or off.

Important safety instructions

Never incorporate equipment or accessories not approved by CTS-Audio or CTS-TECHNOLOGY.
Read all the related PRODUCT INFORMATION documents shipped with the products before exploiting the system.

Intended use
This system is intended for use by trained personnel for professional applications.

As part of a continuous evolution of techniques and standards, CTS-Audio reserves the right to change the specifications of its products and the content of its documents without prior notice.
Check www.cts-audio.com on a regular basis to download the latest document and software updates.

Beware of sound levels.
Do not stay within close proximity of loudspeakers in operation.
Loudspeaker systems are capable of producing very high sound pressure levels (SPL) which can instantaneously lead to permanent hearing damage to performers, production crew, and audience members. Hearing damage can also occur at moderate level with prolonged exposure to sound.
Check the applicable laws and regulations relating to maximum sound levels and exposure times.

Beware of over power risks.
Only use compatible loudspeakers with appropriate presets to avoid damage to the loudspeakers.

Do not use the product outside its operating temperature range.
The product operates at a room temperature between -5 °C / 23 °F and 40 °C / 104 °F. Do not expose the product to direct sun.

Do not expose the product to extreme conditions.
Do not expose the product to moisture (rain, mist, sea spray, steam, humidity, condensation...) or excessive heat (direct sun, radiator...) for a long period of time.

Use the product in a conformed electro-magnetic environment.
The product can be used in the following environment: residential (class B).

Avoid radio interference.
This product has been tested and complies with the regulations of the EMC directive (Electro Magnetic Compatibility). These regulations are designed to provide reasonable protection against harmful interference from electrical equipment, but it cannot be guaranteed that interference will never occur.

Product disconnection
To completely disconnect this product from the mains, disconnect the power supply cord plug from the mains socket outlet.

Power supply cord and socket accessibility
The main plug of the power supply cord shall remain easily accessible. The mains socket outlet shall be easily accessible.

Important safety instructions

Read the maintenance section of this document before servicing the product.

Contact CTS-Audio for advanced maintenance.
Any unauthorized maintenance operation will void the product warranty.
Before sending a product to CTS-Audio for maintenance, save all user presets to files using CTSnet Manager.

Shipping
Use the original packaging for shipping the product, unless it is mounted in a rack with the front and rear panels fixed to the rack, as described in this manual.

Symbols on the product


Explanation of graphical symbols


The lightning flash with arrowhead symbol within an equilateral triangle is intended to alert the user to the presence of uninsulated "dangerous voltage" within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.


The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance instructions in the literature accompanying the product.

Do not open unless authorized. This symbol indicates the presence of electrical shock hazards. It also indicates that no maintenance performed by the end user requires access to internal components.


This marking indicates that this product should not be disposed of with other household waste throughout the EU. To prevent possible harm to the environment or human health from uncontrolled waste disposal, recycle it responsibly to promote the sustainable reuse of material resources. To return your used device, please use the return and collection systems or contact the retailer where the product was purchased. They can take this product for environmentally safe recycling.

The exclamation mark in an equilateral triangle with a lightning bolt is intended to draw the user's attention to the presence of high voltage DC 50V in RJ45 network sockets. Connect only devices that are compliant with this standard to the **CTSnet** network. Connecting to an Ethernet port on a computer, switch or router may result in irreversible damage to the devices, for which CTS-Audio is not responsible.

CTSjunior digital power mixer

P24V | Mic Line | Xover | Eq | Gate | Comp | DeEsser | Feedback Eliminator | AI | Delay | Preset | CTSnet

CTSjunior is an ultra-compact digital mixer with a four-channel power amplifier delivering 85W per output at 4 Ohms in a Half Rack 1 U housing. It has four analog inputs with a preamplifier and 24V Phantom power switched to any input allowing the integration of condenser microphones. The mixer is fully digital and all operations take place in a very efficient DSP processor providing previously unseen functions. It can be mounted in a 19" rack using mounting accessories. You can also connect two units into a full 1U unit using accessories.

The feature set offered by the CTSjunior benefits many types of integration projects. High channel density is an asset for applications such as fills and delays in theatres and performing arts centres, and distributed background music systems in restaurants or museums. With full preamp and phantom control, its use extends far beyond the standard applications. This allows the CTSjunior to be integrated into stand-alone lecture halls, small houses of worship, conference rooms, multimedia rooms. It enables a single CTSjunior to power a combination of full-range enclosures and subwoofers used in home theatres or poolside entertainment systems in a simple and efficient manner.

The device has an efficient SMPS, has a PFC system, thanks to which energy consumption is lower and the device can work in a wide range of input voltages 90-265V, making it a universal device, with stable power regardless of supply voltage fluctuations, e.g. in the case of power supply from generators. The device in ST-BY mode consumes only 0.5W. Energy consumption is constantly monitored along with the temperature of the SMPS and power amplifiers, ensuring the highest level of safety. Additionally, the power amplifiers have full protection such as: protection against DC at the output, protection against short circuit at the speaker output, protection against amplifier overheating.

Housed in an ultra-compact half 1U chassis for efficient rack space utilization and lower integration costs, CTSjunior reduces the carbon footprint of an audio system built with CTS-Audio components. It includes features tailored to installation applications, such as speaker monitoring, protection and management, API for Crestron integration and smart installations. Intelligent mains current limiting is also included. It is remotely controlled and monitored using CTSnet Manager.

How to use this manual

The CTSjunior owner's manual is intended for all actors involved in the system design, implementation, preventive and corrective maintenance of the CTSjunior product. It must be used as follows:

1. Read the technical description for an overview of all product elements, their features, and their compatibilities.
- Technical description (p.12)

2. Before installing the product, perform mandatory inspections and functional checks.
- Inspection and preventive maintenance (p.17)

3. To deploy the product, follow the step-by-step installation instructions and refer to the cabling schemes.
- Installation (p.19)
- Audio and network cabling (p.23)

4. To configure the settings and parameters of the product, follow the step-by-step operation instructions.
- Operation (p.26)

As part of a continuous evolution of techniques and standards, CTS-Audio reserves the right to change the specifications of its products and the content of its documents without prior notice.

Check www.cts-audio.com on a regular basis to download the latest document and software updates.

Contact information

For information on advanced corrective maintenance:
- contact your Certified Provider or your CTS-Audio representative
- for Certified Providers, contact the CTS-Audio customer service: service@cts-audio.com (EMEA/APAC).

Symbols

The following symbols are used in this document:

This symbol indicates a potential risk of harm to an individual or damage to the product.
It can also notify the user about instructions that must be strictly followed to ensure safe installation or operation of the product.

This symbol indicates a potential risk of electrical injury.
It can also notify the user about instructions that must be strictly followed to ensure safe installation or operation of the product.

This symbol notifies the user about instructions that must be strictly followed to ensure proper installation or operation of the product.

This symbol notifies the user about complementary information or optional instructions.

Revision history

version number	publication date	modification
1.0	Jan. 2024	Initial version.

System components

Powering and driving system

CTSjunior	digital power mixer (4x 85W @ 4 Ohms)

Cables in box

Power cable	IEC C13 1,5m

Accessories in box

Side rack handle	1 pcs, rack mount leaf
Side in/out panel	1 pcs, rack mount bracket with XLR and Speakon D-type connector panel
U connecting profile	2 pcs, bracket for mounting two devices into one
Torx m3 screws	12 pcs, screws for fastening torx mounting brackets
Input terminal connector	1 pcs, 12-pole input terminal block connector
Output terminal connector	1 pcs, 8-pole output terminal connector

Software applications

CTSnet Manager	Software for remote control and monitoring of amplified controllers

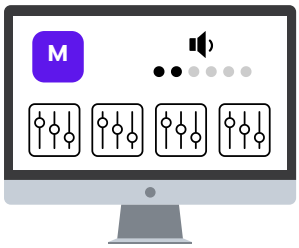
Interface

CTSnet Converter	USB Converter - CTSnet, **Not in box**

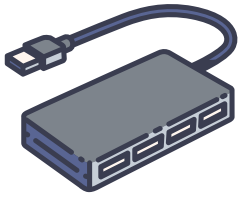
Familiarize yourself with the CTSnet network standard and device addressing rules.
Then, familiarize yourself with the CTSnet Manager software support

Loudspeaker enclosures

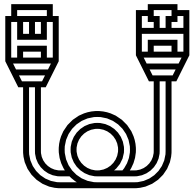
Refer to the user documentation of the loudspeaker systems for detailed instructions about the enclosures and their connection to the amplified controllers.



M CTSnet Manager



C CTSnet Converter



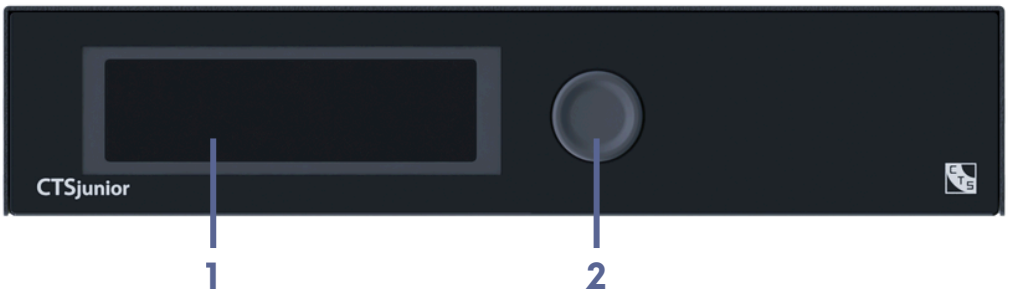
CAT5e minimum

Main features

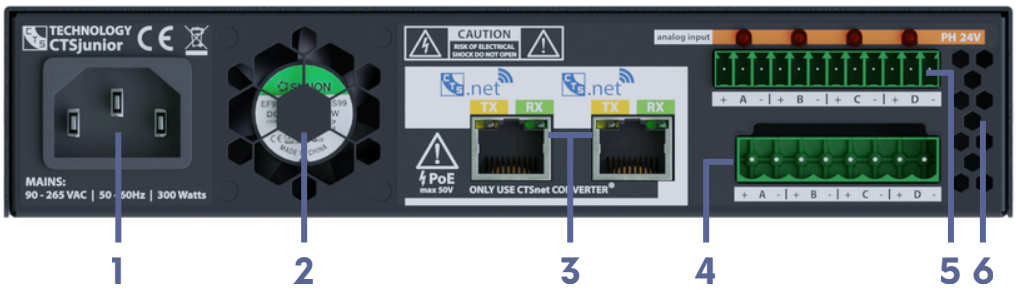
Internal components

The heart of the CTSjunior is an advanced Analog Devices DSP processor managing 6x4 audio channels. Channel processing is very robust. Each input channel has numerous algorithms for filtering, dynamics, speech processing, priorities and anti-feedback functions. It has four analog inputs with adjustable gain 0 - 55dB and switchable phantom power, providing full support for signals from the console, line, microphone and condenser microphones. The ADC converter is characterized by high dynamics of 122dB and 32bit conversion resolution. The DACs also feature 32-bit processing resolution and high processing dynamics of 114dB. The device has a high-performance, universal **SMPS** power supply with **PFC** (Power Factor Correction) that provides power to devices and a dual-port **CTSnet** interface.

Front and rear panels



1 OLED
2 ENCODER & SWITCH



1 IEC connector - power input
2 hot air outlet
3 CTSnet Connectors
4 power output
5 signal input
6 ventilation grille - air intake

Signal processing and amplification

Signal inputs

The CTSjunior has four balanced analog inputs with a +18dBu range on installation connectors and an AES/EBU input on CTSnet connectors.

AES/EBU

CTSjunior can be fed with a single AES/EBU digital audio signal (containing two channels) using CTSnet.

Audio signals can come from a digital mixer or from any audio device that complies with the AES/EBU (AES3) digital audio standards.

Input signals can be sent to daisy-chained amplifier controllers using CTSnet over CAT5e cables

The AES/EBU input port is equipped with an SRC (Sample Rate Converter) that has been selected to support a wide range of input formats (16 - 24 bits / 32 - 192 kHz). The SRC converts the formats to the 24 bits / 48 kHz internal format used by the amplified controller. The SRC is a high-quality implementation that provides constant propagation delay regardless of the input sampling frequency.

Digital domain benefits

Keeping the signal in the digital domain provides the following benefits (with any digital mixing desk or any audio device) compared to the analog signal distribution:

- Better audio quality by removing one D/A - A/D cycle.
- Optimized level chain by removing the risk of level misalignment between console and amplified controllers.
- Digital signal refreshed at each amplified controller in a daisy-chain.
- Improved maximum cable length. CTSjunior has been tested with up to 300 m / 984 ft of two models of AES/EBU
- rated cables (single cuts, digital source signal running at Fs = 48 kHz): • 1696A from BELDEN INC.
- OT234H from KLOTZ communications GmbH.

Analog

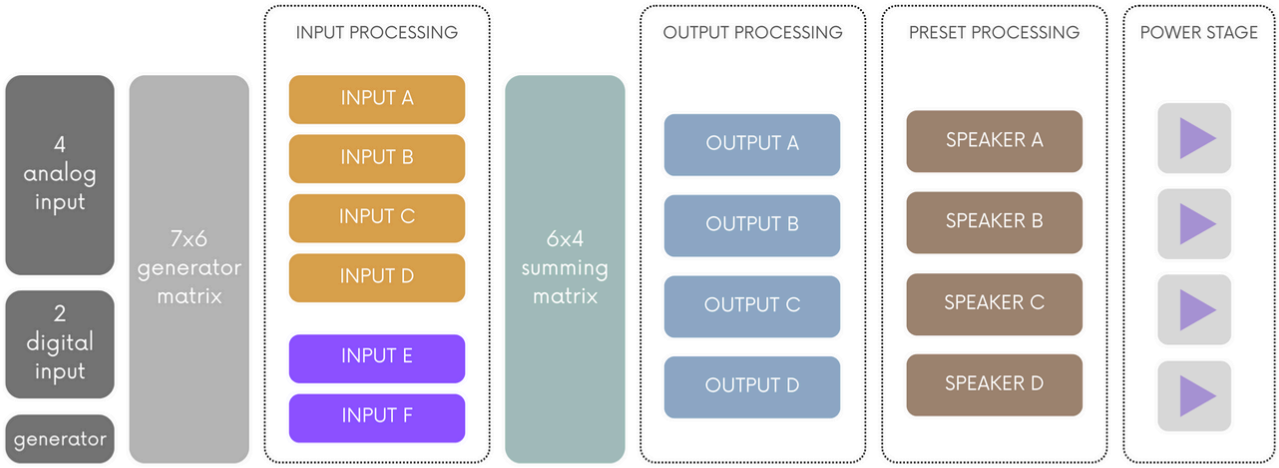
CTSjunior can be fed with four balanced analog audio signal using the 12-point terminal block.
The input signal can be transmitted to daisy-chained amplified controllers using the 12-point terminal block.
To be processed by the DSP, the analog signal must be converted into a digital signal. For this purpose, the CTSjunior amplified controller is fitted with one 32-bit A/D converter with a sampling rate of 48 kHz, allowing an encoding dynamic range of 122 dB (A-weighted, 20 kHz bandwidth).

DSP architecture

Algorithms enable optimal operation and protection of each transducer in CTS-Audio systems, providing an even more natural, transparent and realistic sound experience.

- The DSP engine is a 40-bit DSP at 48 kHz sampling rate providing an enhanced dynamic range since it does not generate calculation clips like a fixed point DSP.
- A dedicated engineering approach combining IIR and FIR filters generates perfectly linearized phase curves and significantly improved impulse responses.
- The 6 × 4 matrix architecture offers flexibility for various system configurations.
- A delay of up to 250 ms can be set for each output channel.
- Transducer protection system offers advanced protection by simultaneously monitoring the excursion and the temperature of the transducer.
- With a complete factory preset library and the possibility to create additional user presets, the flash memory
- provides a quick access to all the usual CTS-Audio speaker system configurations (refer to the Preset Guide).

Audio path parameters



Input A to D processing

Input E to F processing

Output A to D processing

Power supply and amplifier section

Class-D amplification circuitry ensures the CTSjunior's energy efficiency and minimal heat dissipation. The CTSjunior delivers (CEA-2006 / 490 A 20 ms, sine wave pulse <1% THD, 1 kHz):
• 4 x 85 W at 4 Ω, all channels driven
• 4 x 45 W at 8 Ω, all channels driven
The CTSjunior is an eco-friendly, ruggedized controller based on a universal switch-mode power supply (SMPS) suitable for 100 VAC - 240 VAC (±10%, 50 Hz - 60 Hz) mains power. The SMPS is equipped with a PFC (Power Factor Correction) circuit that maximizes the amplifier's efficiency and utilizes nearly 100% of the available power, while offering very high tolerance to mains voltage fluctuations. This means a reduction in electricity demand (cable diameter, power conditioning, etc.), which translates into significant savings.

Speaker outputs

CTSjunior features female 8-point terminal blocks for loudspeaker outputs.
For the enclosure drive capacity and the enclosure maximum SPL per amplified controller, refer to the Amplification reference technical bulletin or the Preset guide.

Speaker protection

Algorithms enable optimal operation and protection of each transducer in CTS-Audio systems, providing an even more natural, transparent and realistic sound experience.

Power supply and amplifier section

Class D amplification circuitry ensures that the CTSjunior is energy efficient. The CTSjunior delivers (CEA-2006/490A 20ms, <1% THD sine wave, 1 kHz):

- 4 x 85 W into 4 Ω, all channels driven
- 4 x 45 W into 8 Ω, all channels driven

The CTSjunior is a green amplifier that relies on a universal switch-mode power supply (SMPS) suitable for 100 VAC - 240 VAC (±10%, 50 Hz - 60 Hz) mains. The SMPS is equipped with PFC (Power Factor Correction) that maximizes the amplifier's efficiency and uses almost 100% of the available electrical power with a very high tolerance for network instability. This means reducing electrical power requirements (cable diameter, power conditioning, etc.) to achieve significant savings.

Speaker outputs

The CTSjunior has one female 8-point terminal block for speaker outputs. The terminal block can be used to connect low impedance speakers. For information on enclosure drive capacity and maximum enclosure sound pressure level (SPL) per amplified controller, refer to the Amplification reference technical bulletin or the Preset guide.

Speaker protection

The driver protection system provides dual analysis of signal intensity and voltage in real time and full-band RMS. In extreme conditions, when the component diaphragms reach the overexcursion zone or when the voice coil temperature reaches a critical point, the protection is activated and acts as a power regulator. As a result, the amount of power delivered to any channel is adjusted to the dynamic and thermal capacity of each individual driver. This is an algorithm that adapts to speakers with a passive crossover, protecting the woofer and the high-frequency compression driver

Monitoring and control

User interface

The OLED display provides real-time monitoring functionalities:
- power
- mute, level, limit, clip, and error for each output
- phantom power
- feedback eliminator flag

LEDs on the rear of the housing provide monitoring of:
- phantom
- communication CTSnet

Refer to section Operation (p.26) for detailed operating instructions.

CTSnet remote control network

Remote control of processors and amplified controllers requires only connecting the device via an RJ45 cable to the CTSnet converter. It is important to properly address devices in the network when connecting multiple devices. Each device must have a different ID address in the range of 1 - 250, this will allow them to communicate separately and correctly search for devices in the network.

CTSnet is a protocol operating on the **RS485** physical layer and can operate on three different speed modes: **Normal Mode 250kbps**, **Slow Mode 57.6kbps**, **Fast Mode 1Mbps**. This allows you to adapt the network to your needs, e.g. in installations managed by Crestron and to connect to Crestron gateways, we recommend the Slow Mode mode, which allows for very long buses >600m

The use of RS485 allows for very long signal transmission, no need to use network switches and minimizes installation errors during implementation. The protocol is fully safe, equipped with checksums, so there is no fear of errors or problems with disconnecting cables during operation. The entire system immediately finds itself in the network after reconnection. Connections are made using **RJ45** connectors and the minimum cable requirement is CAT5e U/FTP cables (or higher category).

The devices have available API for management by external intelligent systems. All information about the CTSnet standard and sample commands can be found in the CTSnet specification file.

Third party management solutions

The devices can be easily integrated with intelligent systems. We provide documentation and design support for such solutions. For questions, please contact: laboratory@cts-audio.com

How to do preventive maintenance

Inspect the product periodically as indicated, and after any corrective maintenance operation.

Structure and cleanness

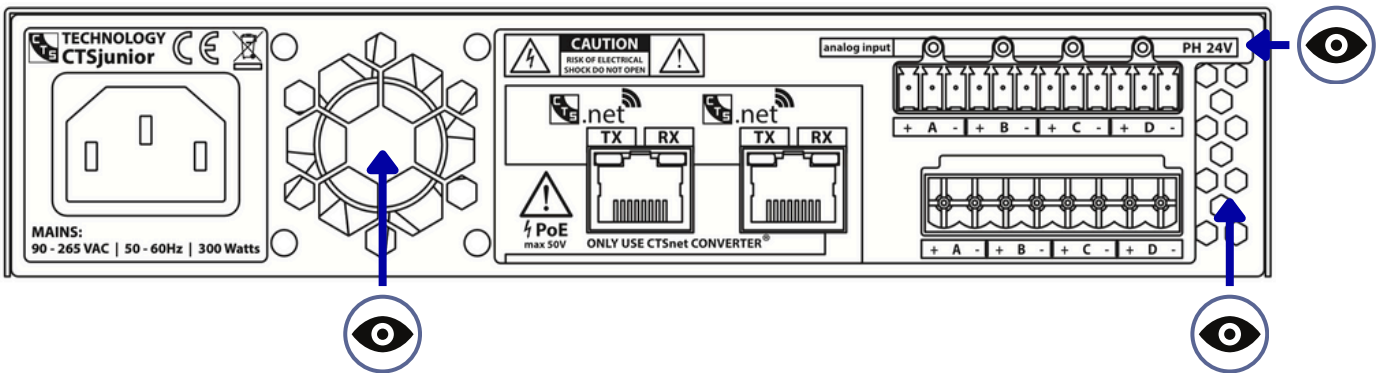
Before and after each deployment (touring applications), or at least once a month (fixed installations): • CHK - External structure (p.17)
Inspection and preventive maintenance
• CHK - Cleanness (p.18)

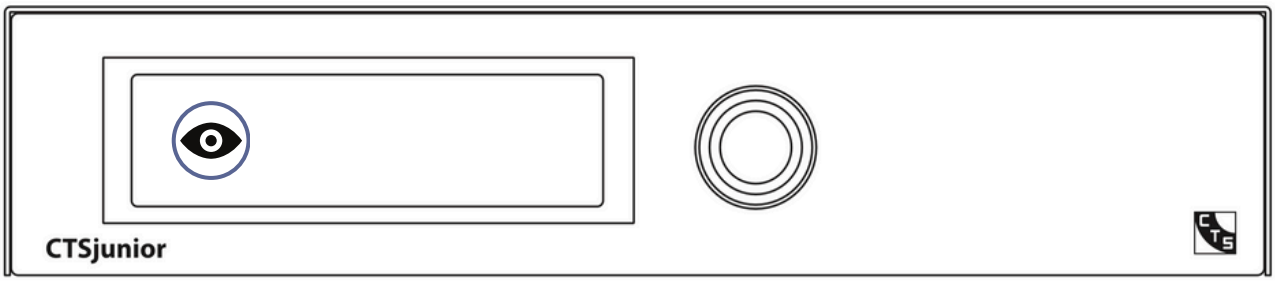
Functionalities

At least once a year:
- CHK - Normal start-up sequence (p.18)
- CHK - Network functionalities and firmware (p.18)

CHK - External structure

The  indicates a visual inspection.





CHK - Cleanness

Equipment

- air blower

Procedure

Clean the amplified controller through the front grill with an air blower.

CHK - Normal start-up sequence

Procedure

1. Plug the amplified controller to mains.
2. Check that all the LEDs light up in orange during the start-up sequence.
3. Check that fan noise can be heard for a few seconds during the start-up sequence.

CHK - Network functionalities and firmware

Equipment

- computer with CTS Manager version 1.0 minimum
- appropriate network cable

Procedure

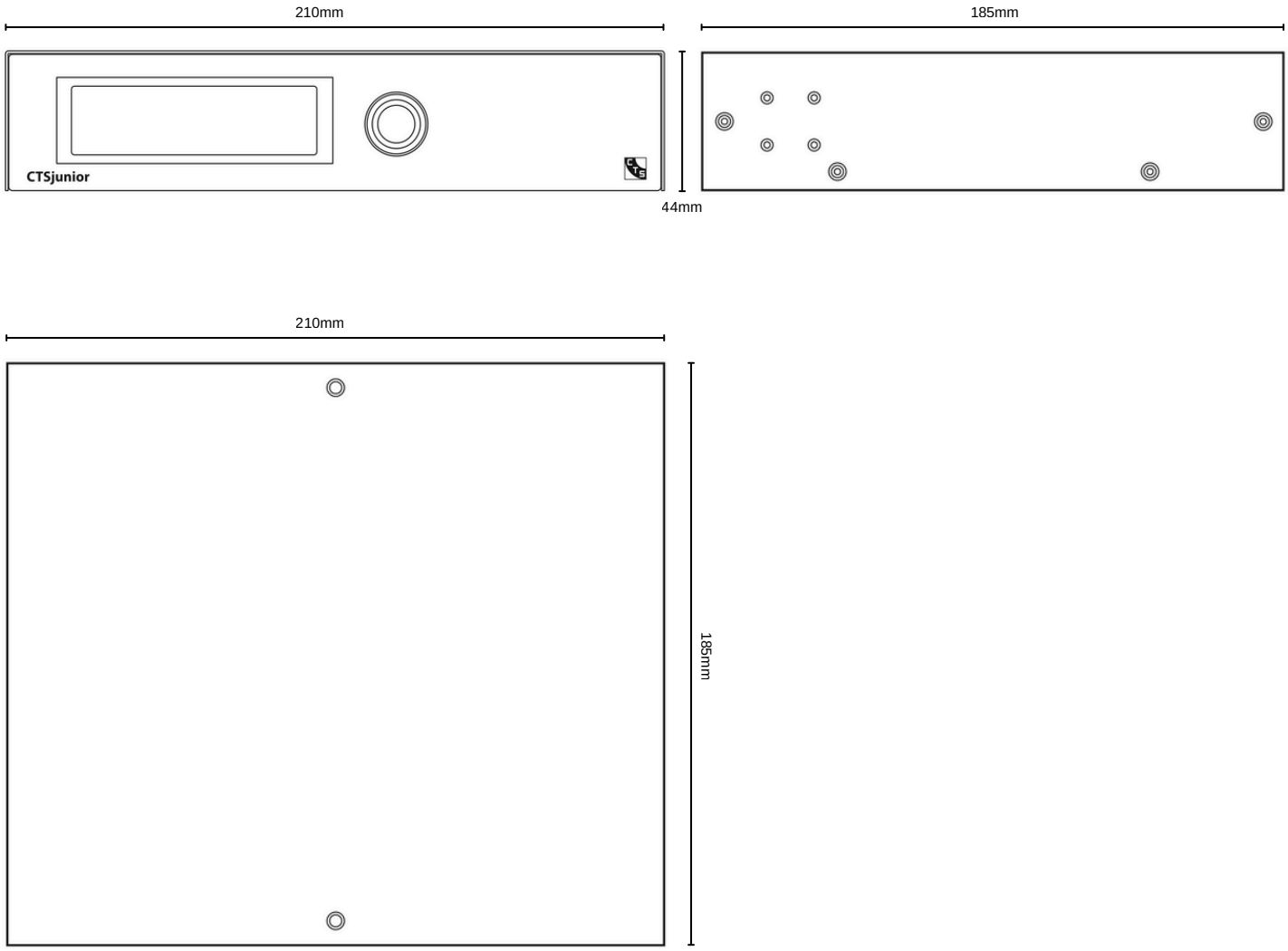
1. Connect the CTSnet port on the repeater controller to the CTSnet converter. Connect the converter to the USB port of a computer with CTSnet Manager software installed.
Use the appropriate network cable.
2. Run CTSnet Manager.
3. Check that the amplified controllers are detected as online Units.
Refer to the CTSnet Manager Help.
4. Check that all CTSjunior in the system run the same version of the firmware, and that it matches with the version of CTSnet Manager in use.
Refer to the CTSnet Manager and Firmware Compatibility Issues technical bulletin.
5. If convenient, update CTSnet Manager and the firmware to the latest versions.

If using a third-party control system such as Crestron or QSC Q-SYS, check that updating the firmware does not break compatibility.

Mounting

The CTSjunior is one rack unit (1U) high and half-width and can be mounted in an EIA-compliant 19" rack using mounting accessories and four front panel mounting points. To mount the controller with the amplifier on the front rails of the rack, use the mounting hardware provided by the rack manufacturer.

CTSjunior dimensions



Risk of Damage to the Amplifier Controller
The amplifier controller should be installed in a location that allows for free airflow and exchange. The warranty does not cover mechanical damage to the amplifier controller caused by improper installation or unauthorized tampering with the enclosure.

CTSjunior is 10" RACK compatible after ordering the additional CJ01Z mounting bracket

Ventilation

To maintain moderate operating temperatures, the CTSjunior is equipped with DSP-controlled fans and grills providing rear to rear airflow.

Ventilation instructions
Install the controller in an open area so that the front and rear panels are located at a minimum distance of 30 cm / 12 in from any external object or structure.
Ensure the rear grill is clean and dirt free.
Do not block the rear and rear ventilation grills.

Ventilation when rack-mounted
Do not block the ventilation grills with front or back panels or doors. If not possible, use a forced-ventilation system.
When stacking more than one controller in a rack, mount them directly on top of each other or close any open space in the rack with blank panels.

Connecting to AC mains

Electrical specifications

AC mains specifications

Verify the electrical conformity and compatibility of the mains supply.
Only connect the product to an AC power outlet rated 100-240 V, 50-60 Hz, with the following current values:
100 V (Japan): 5 A
120 V (North America): 4 A
220-240 V (EU): 2 A
WARNING: The product is of Class I construction and shall be connected to a mains socket outlet with a Protective Earth connection.

Three-phase circuit

When the product is used in a three-phase circuit, verify the electrical conformity and compatibility of the three-phase circuit.
Verify that the three phases work, and balance the loads between the three phases.
Verify that the neutral and earth work.
Never try to emulate a 230 V circuit connecting an apparatus to two live wires of a 120 V three-phase circuit.
Never try to emulate a 200 V circuit connecting an apparatus to two live wires of a 100 V three-phase circuit.

Circuit breaker

Always interconnect a circuit breaker between the product and the mains supply.
Use these references, or equipment with equivalent characteristics: 100 V (Japan): 10 A Terasaki S125-NF 1P
120 V (North America): 6.3 A Square C QO
220-240 V (EU): 6.3 A Type B

Power cord

The detachable power cord has an IEC connector on one end and a country-specific plug on the other.

type	plug	cable ratings	live	neutral	ground
CE	CEE7/VII, earthed	10 A / 250 V	brown	blue	green/yellow
CN	GB 2099, earthed				
UK	BS 1363, earthed				
INT	bare ends (local power plug to be fitted)				
US	NEMA 5-15, earthed	10 A / 125 V	black	white	green

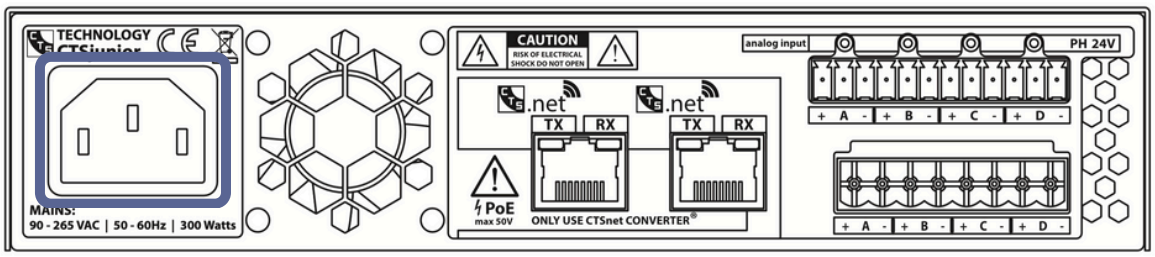
Strictly apply the specific safety regulations of the country of use.
Do not defeat the ground connection of the supplied power cord using an adaptor or any other method.
A suitable plug must be wired to the INT power cord.
Verify that the plug conforms to the specific voltage and current rating given in section Electrical specifications (p.20).

Plugging the amplified controller

How to plug the amplified controller to the AC mains.

Procedure

— First, connect the IEC connector to the amplified controller mains panel.



— Then, connect the power plug to the mains socket.

Power consumption

The CTSjunior power requirements depend on the load impedance and the signal level.

Mains input power and current draw (all channels driven)

Power consumption (all channels driven)

Maximum output power (CEA-2006 / 490A 20 ms, ≤ 1% THD, 1 kHz, all channels driven, sine burst)	4 × 25 W RMS (at 16 Ω)	4 × 45 W RMS (at 8 Ω)	4 × 85 W RMS (at 4 Ω)
1/3 output power (-5 dB)	0.24 A / 55 W	0.35 A / 80 W	0.6 A / 140 W
1/8 output power (-9 dB)	0.15 A / 30 W	0.18 A / 42 W	0.26 A / 60 W

Current values given for mains rated at 230 V.

Multiply by:

- 2.3 for 100 V
- 1.92 for 120 V
- 1.15 for 200 V

Output power references
A third (1/3) of the maximum output power corresponds to the worst case scenario of a program source using highly compressed music or pink noise with amplified controller driven to clip level.
An eighth (1/8) of the maximum output power corresponds to a loud music program with a small dynamic range and 9 dB of headroom (IEC standard power rating).

Mains input power and current draw in Idle and Standby modes

Idle	0.1 A / 15 W
Standby	0.02 A / 1 W

Due to line filter operation, power factor is < 0.65 in Idle mode, and < 0.2 in Standby mode. Current values above are given for mains rated at 230 V and decrease with lower mains.

Heat power calculation

If a 4 Ω load is connected to each output channel of the CTSjunior, each channel delivers up to 120 W. With a standard use at one eighth (1/8) of full power (9 dB headroom), the power delivered per channel is:

85 W / 8 = 10 W

Therefore, a total power of:

4 × 10 W = 40 W

According to the table in section Power consumption (p.21), the CTSjunior power consumption is 60 W. The heat power produced is then (difference between power consumption and output power):

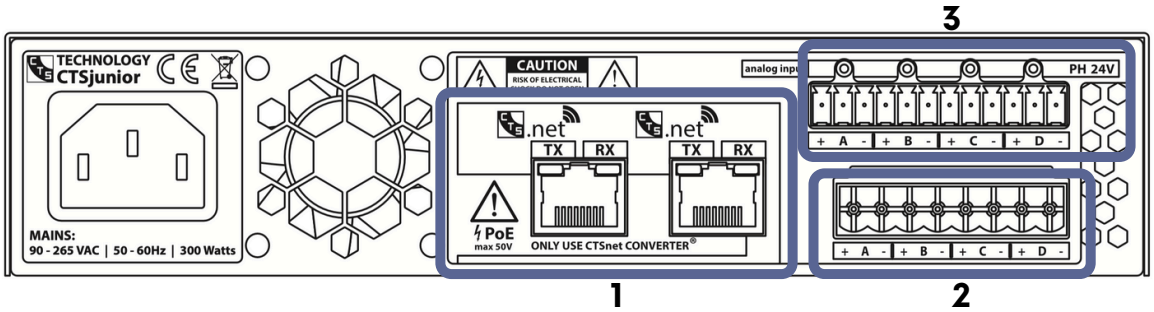
60 W - 40 W = 20 W

Audio and network cabling

Connection panels

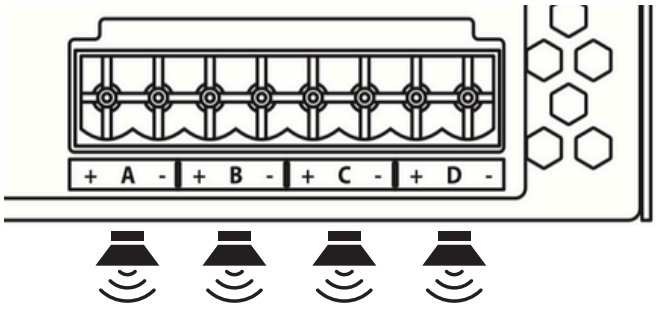
The amplified controller's rear side features connectors for audio and network cabling:
1. For connection to an CTSnet network, and to be remotely controlled by CTSnet Manager.
2. For connection to the loudspeakers.
3. For connection of the analog audio sources and for linking the signals to another amplified controller.

CTSjunior audio and network connection panels



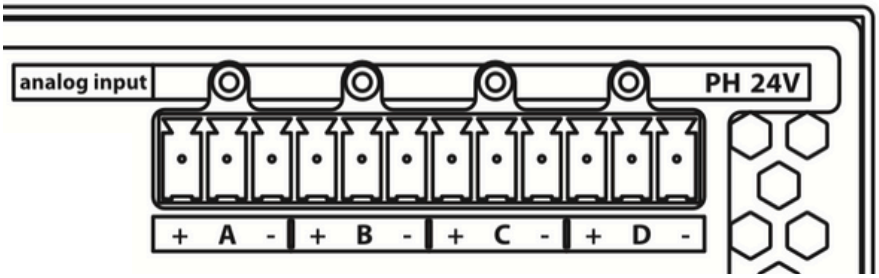
Speaker connectors

Use the female 8-point terminal blocks for loudspeaker connection. The connector is wired right as follows:

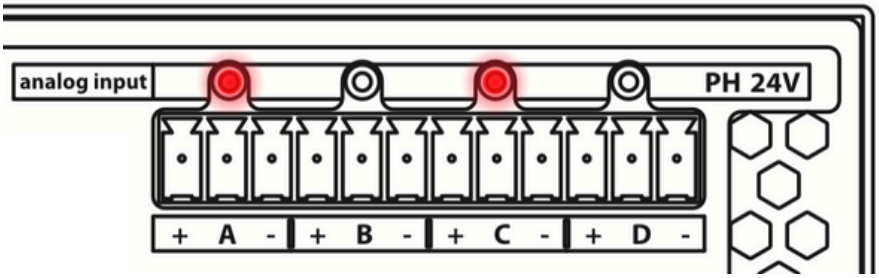


Analog/Digital connectors

Use the male 12-point terminal block for analog signal cabling.



Phantom power for condenser microphone
There are four red LEDs above the 12-pin signal strip that indicate the presence of Phantom voltage at the input.



Warning!
Make sure there is no phantom power present at the input, which may damage the output cards of laptops, phones or other devices.

Analog inputs
The headroom of the input circuits is high enough to accept the maximum output level from almost any line-level signal source (up to 18 dBu).
Input signals can be sent to series-connected control amplifiers disabling microphone mode and phantom power.

AES/EBU inputs
Supported digital input format

Standards	AES/EBU (AES3)
Sampling frequency (Fs)	32, 44.1, 48, 88.2, 96, 176.4, or 192 kHz
Word length	16, 18, 20, or 24 bits
Synchronization	signal resampled to internal clock at 48 kHz

In AES/EBU input mode, the input can receive up to two digital signals (one stereo pair). The CTSnet connector is electronically buffered, allowing any number of controllers to be daisy-chained to the amplifier. It also features a safety relay to ensure wiring continuity in the event of a controller/amplifier power failure.

The signals are visible as input channels **E** and **F** in CTSnet Manager

Speaker

When a short-circuit is detected, output channels are automatically muted. After resolving the short-circuit issue, output channels must be manually unmuted.

AnaloUse the female 8-point terminal blocks to connect an enclosure to the amplified controller in a single-ended (SE). For information on enclosure drive capacity and maximum enclosure sound pressure level (SPL) per amplified controller, refer to the Amplification Reference technical bulletin or the preset guide.

Using multicore loudspeaker cables
Never connect more than one amplified controller on a single multicore loudspeaker cable.
Connecting several amplified controllers may cause audible interferences on the loudspeaker enclosures when the amplified controllers are in idle mode, even when muted.

Speaker layout recommendations

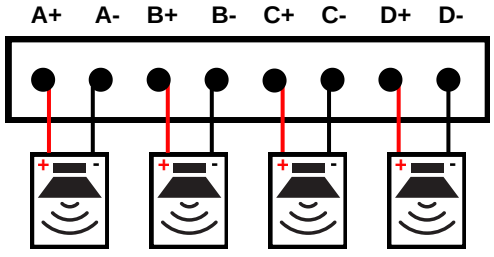
These recommendations only apply to output channels operating in single-ended (SE) mode.

For best performance when using the CTSjunior output channels in SE mode, it is recommended to balance the load between the odd and even output channels, especially with a 4-ohm load. In practice, this means that speakers of the same type should be evenly distributed between the odd and even output channels.

Procedure

1. Refer to Connection panels (p.23) to locate the pins.
2. Connect the enclosure(s):

Strictly follow the loudspeaker wiring diagrams.
Risk of unwanted noise and errors (bridge modes not operational).
Risk of acoustic cancellations and lack of audio source localization (discrepancy in loudspeaker polarities).

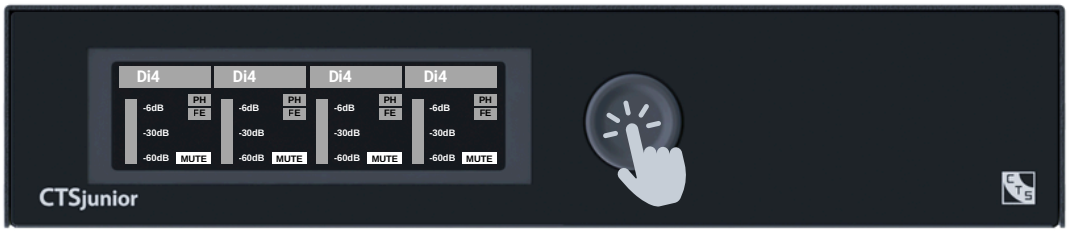


Unused pins do not need to be connected.
For more enclosure-specific cabling schemes, refer to the owner's manual of the enclosure.
3. Turn on CTSjunior.
4. Connect CTSjunior to CTSnet Manager.
If using an existing session, solve any Unit Type conflicts in the Unit Matcher.

Powering on/off

The CTSjunior powers on by pressing the encoder. The device's state is memorized. If it is disconnected from the mains, it will restart in its previous state when power returns. The device powers down without any loudspeaker clicks, even with open input channels.

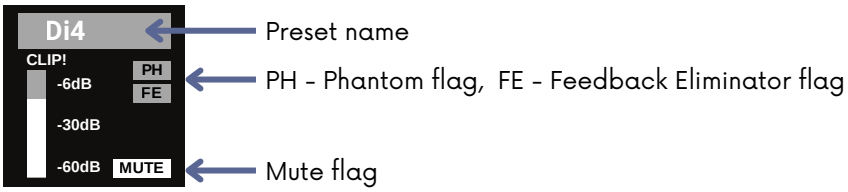
If power is lost, the amplified controller shuts down, but all parameters are restored when the amplified controller is powered again.
The OLED displays the ID number and Username set in CTSnet Manager when the amplifier is in standby mode.



Use CTSnet Manager to set the amplified controller to standby or back to operating mode. Refer to the CTSnet Manager Help.

Interpreting the front panel OLED

Normal working - start screen:



STBY - STBY screen:

Specifications

Specifications

All values given in this section are typical values.

General

Output power EIA (1% THD, 1 kHz, all channels driven)	4x 85W (at 4 Ω)
Maximum output voltage	29V (Peak voltage, no load)
Amplification class	class D
Digital Signal Processor (DSP)	80 bit, 48 kHz sampling rate
Frequency response 20 Hz - 20 kHz	± 0.5 dB at 8 Ω
Distortion THD+N (20 Hz - 10 kHz)	< 0.02% , at 8 Ω, 12 dB below rated power
Output dynamic range	110dB (20 Hz - 20 kHz, 8 Ω A-weighted)
Amplification gain	18dB
Noise level	-83dBV (20 Hz - 20 kHz, A-Weighted)
Channel separation	> 85 dB (at 1 kHz, 8 Ω)
Damping factor	> 30 (100 Hz and below, 8 Ω)
Output delay	0ms to 250ms

Mains input power and current draw (all channels driven)

Maximum output power	4 × 120 W at 2.7 Ω
1/3 output power (-5 dB)	0.6A / 140W
1/8 output power (-9 dB)	0.26A / 60W

Mains input power and current draw in Idle and Standby modes

Idle	0.1 A / 15 W
Standby	0.02 A / 1 W

Due to line filter operation, power factor is < 0.65 in Idle mode, and < 0.2 in Standby mode. Current values above are given for mains rated at 230 V and decrease with lower mains.

Power consumption (all channels driven)

Maximum output power (CEA-2006 / 490A 20 ms, ≤ 1% THD, 1 kHz, all channels driven, sine burst)	4 × 25 W RMS (at 16 Ω)	4 × 45 W RMS (at 8 Ω)	4 × 85 W RMS (at 4 Ω)
1/3 output power (-5 dB)	0.24 A / 55 W	0.35 A / 80 W	0.6 A / 140 W
1/8 output power (-9 dB)	0.15 A / 30 W	0.18 A / 42 W	0.26 A / 60 W

Current values given for mains rated at 230 V.

Multiply by:

- 2.3 for 100 V
- 1.92 for 120 V
- 1.15 for 200 V

Mains input power and current draw in Idle and Standby modes

Idle	0.1 A / 15 W
Standby	0.02 A / 1 W

Due to line filter operation, power factor is < 0.65 in Idle mode, and < 0.2 in Standby mode. Current values above are given for mains rated at 230 V and decrease with lower mains.

Power supply

Model	universal Switched Mode Power Supplies (SMPS) with power factor correction (PFC)
Power factor	> 0.9 (at full load)
Mains rating	100 V AC - 240 V AC ± 10%, 50 Hz - 60 Hz, 300 W
Nominal current requirements	5 A for 100 V AC 4 A for 120 V AC 2 A for 220 V AC - 240 V AC
Connector	IEC

Operating conditions

Temperature Maximum altitude	-5 °C / 23 °F to 40 °C / 104 °F 3000 m

Protection

Mains and power supply	over and under voltage
	over temperature
	overcurrent (fuse protection, and inrush current protection)
	power budget limiter
Power outputs	overcurrent
	DC
	short circuit
	over temperature
Transducers protection	CTS-Processing
	excursion temperature
	over-voltage
Cooling system	fans with temperature-controlled speed
Fan noise (free field, 1 m)	in Idle mode: 15 dBA
	at 1/8 output power: 20 dBA
	at maximum speed: 28 dBA

Interface and connections

Indicators	OLED 64x256px
Output connectors	8 female 4-point terminal block
CTSnet connectors	2 × RJ45 I/O

Input signal distribution

Interface and connections	Terminal tool of CTSnet Manager.
Routing and summation matrix	6 × 4
Input	1 for analog or AES/EBU on the rear RJ45 Primary
Link	1 for analog or AES/EBU on the rear RJ45 Secondary

Digital input

Supported digital input format

Standards	AES/EBU (AES3)
Sampling frequency (Fs)	32, 44.1, 48, 88.2, 96, 176.4, or 192 kHz
Word length	16, 18, 20, or 24 bits
Synchronization	signal resampled to internal clock at 48 kHz

Sample Rate Converter (SRC)

Sampling frequency	48 kHz (SRC referenced to the amplified controller internal clock)

Specifications

Word length	24 bits
Dynamic range	140 dB
Distortion THD+N	< -120 dBFS (dB Full Scale)
Bandpass ripple	±0.05 dB 20 Hz - 20 kHz, 48 kHz

Preamp gain

Range	0 dB to +55dB
Steps	1.0dB

Input gain

Range	-60 dB to +15 dB
Steps	0.1 dB

Latency

Analog and AES/EBU

In standard operating mode	1.4 ms
In low latency operating mode	1.18 ms

Glossary

CE	Europe
CHK	check procedure
CN	China
D/R	disassembly/reassembly procedure
INT	international (bare lead version of the power cable)
KR	repair kit
SMPS	Switched Mode Power Supply (power supply inside of the amplified controller)
UK	United Kingdom
US	United States

EU Declaration of Conformity (DoC)

We

CTS - TECHNOLOGY

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

CTSjunior amplified digital mixer

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

2014/35/EU: Low Voltage Directive
2014/30/EU: Electro-Magnetic Compatibility Directive
2015/863/EU: RoHS 3 Directive

The following haemonized standards and technical specifications have been applied:

EN 62368-1: 2014 Audio/video, information and communication technology equipment - Part 1: Safety requirements
EN 55032: 2015 Electromagnetic compatibility of multimedia equipment - Emission Requirements
EN 55032: 2017 Electromagnetic compatibility of multimedia equipment - Immunity Requirements
EN 63000: 2018 Technical documentation for the assessment of electrical and electronic products with respect to the restriction of hazardous substances

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