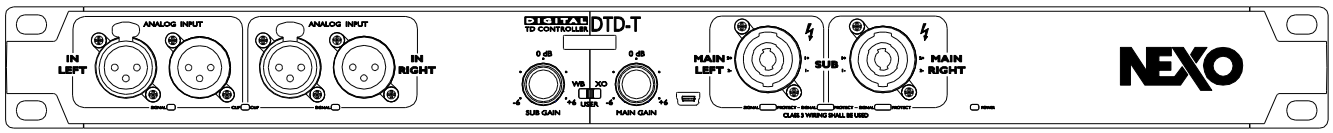
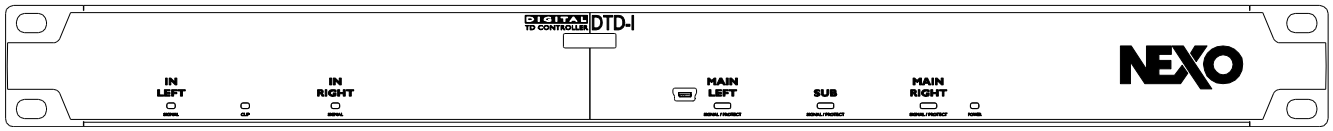
Digital TD controllers

DTD-T-U DTD-T-N



DTD-I-U DTD-I-N



User Manual v1.2

FCC information (U.S.A.)

1. IMPORTANT NOTICE: DO NOT MODIFY THIS UNIT!

This product, when installed as indicated in the instructions contained in this manual, meets FCC requirements. Modifications not expressly approved by NEXO-SA may void your authority, granted by the FCC, to use the product.

2. IMPORTANT:

When connecting this product to accessories and/or another product use only high quality shielded cables. Cable/s supplied with this product MUST be used. Follow all installation instructions. Failure to follow instructions could void your FCC authorization to use this product in the USA.

3. NOTE:

This product has been tested and found to comply with the requirements listed in FCC Regulations, Part 15 for Class "B" digital devices. Compliance with these requirements provides a reasonable level of assurance that your use of this product in a residential environment will not result in harmful interference with other electronic devices. This equipment generates/uses radio frequencies and, if not installed and used according to the instructions found in the user's manual, may cause interference harmful to the operation of other electronic devices. Compliance with FCC regulations does not guarantee that interference will not occur in all installations. If this product is found to be the source of interference, which can be determined by turning the unit "OFF" and "ON", please try to eliminate the problem by using one of the following measures:

Relocate either this product or the device that is being affected by the interference.

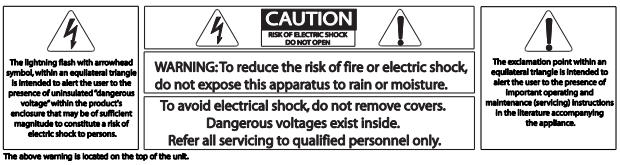
Utilize power outlets that are on different branch (circuit breaker or fuse) circuits or install AC line filter/s.

In the case of radio or TV interference, relocate/reorient the antenna. If the antenna lead-in is 300 ohm ribbon lead, change the lead-in to co-axial type cable.

If these corrective measures do not produce satisfactory results, please contact the local retailer authorized to distribute this type of product. If you cannot locate the appropriate retailer, please contact the After Sales department of NEXO-SA, Parc d'Activité du Pré de la Dame Jeanne, B.P. 5, 60128 PLAILLY, FRANCE.

The above statements apply ONLY to those products distributed by NEXO-SA or its subsidiaries.

* This applies only to products distributed in the United States of America.



The above warning is located on the top of the unit.

Important safety instructions

1 Read these instructions.
2 Keep these instructions.
3 Heed all warnings.
4 Follow all instructions.
5 Do not use this apparatus near water.
6 Clean only with 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 is 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 Unplug this apparatus during lightning storms or when unused for long periods of time.
13 Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.

Precautions

Please read carefully before proceeding. Please keep this manual in a safe place for future reference.

⚠ **WARNING!** Always follow the basic precautions listed below to avoid the possibility of serious injury or even death from electrical shock, short-circuiting, damages, fire or other hazards. These precautions include, but are not limited to, the following:

Power supply/Power cord

• Only use the voltage specified as correct for the device. The required voltage is printed on the name plate of the device.

• Use only the included power cord if any.

• Do not place the power cord near heat sources such as heaters or radiators, and do not excessively bend or otherwise damage the cord, place heavy objects on it, or place it in a position where anyone could walk on, trip over, or roll anything over it.

• Be sure to connect to an appropriate outlet with a protective grounding connection. Improper grounding can result in electrical shock.

• Remove the electric plug from the outlet when the device is not to be used for extended periods of time, or during electrical storms.

• When removing the electric plug from the device or an outlet, always hold the plug itself and not the cord. Pulling by the cord can damage it.

• To disconnect this device from the mains, unplug the power cord.

• Always turn the power off when the device is not in use.

Do not open

• Do not open the device or attempt to disassemble the internal parts or modify them in any way. The device contains no user-serviceable parts. If it should appear to be malfunctioning, discontinue use immediately and have it inspected by qualified NEXO-SA service personnel.

• NEXO-SA cannot be held responsible for damage caused by improper use or modifications to the device or data that is lost or destroyed.

Water warning

• Do not expose the device to rain; use it near water or in damp or wet conditions, or place containers on it containing liquids which might spill into any openings.

• If any liquid such as water seeps into the device, turn off the power immediately and unplug the power cord from the AC outlet. Then have the device inspected by qualified NEXO-SA service personnel.

• Never insert or remove an electric plug with wet hands.

If you notice any abnormality

• If the power cord or plug becomes frayed or damaged, or if there is a sudden loss of sound during use of the device, or if any unusual smells or smoke should appear to be caused by it, immediately turn off the power switch, disconnect the electric plug from the outlet, and have the device inspected by qualified NEXO-SA service personnel.

• If this device should be dropped or damaged, immediately turn off the power switch, disconnect the electric plug from the outlet, and have the device inspected by qualified NEXO-SA service personnel.

Location

• Before moving the device, remove all connected cables.

• When setting up the device, make sure that the AC outlet you are using is easily accessible. If some trouble or malfunction occurs, immediately turn off the power switch and disconnect the plug from the outlet. Even when the power switch is turned off, electricity is still flowing to the product at the minimum level. When you are not using the product for a long time, make sure to unplug the power cord from the wall AC outlet.

• If this device is to be mounted in an EIA-standard rack, leave the back of the rack open and make sure that it is at least 10 cm away from walls or surfaces. Also, if this device is to be mounted with devices that tend to generate heat, such as power amplifiers, be sure to keep an adequate gap between this device and the heat-generating devices or install ventilation panels to prevent high temperatures from developing inside this device.

• Inadequate ventilation can result in overheating, possibly causing damage to the device(s), or even fire.

• Do not use the device in a confined, poorly-ventilated location. If this device is to be used in a small space other than an EIA-standard rack, make sure that there is adequate space between the device and surrounding walls or other devices: at least 10 cm at the sides, 15 cm behind and 40 cm above. Inadequate ventilation can result in overheating, possibly causing damage to the device(s), or even fire.

• Do not expose the device to excessive dust or vibrations, or extreme cold or heat (such as in direct sunlight, near a heater, or in a car during the day) to prevent the possibility of panel disfiguration or damage to the internal components.

• Do not place the device in an unstable position where it might accidentally fall over.

• Do not block the vents. This device has ventilation holes at the sides to prevent the internal temperature from becoming too high. In particular, do not place the device on its side or upside down. Inadequate ventilation can result in overheating, possibly causing damage to the device(s), or even fire.

• Do not use the device in the vicinity of a TV, radio, stereo equipment, mobile phone, or other electric devices. Doing so may result in noise, both in the device itself and in the TV or radio next to it.

Connections

• Before connecting the device to other devices, turn off the power for all devices. Before turning the power on or off for all devices, set all volume levels to minimum.

• Use only speaker cables for connecting speakers to the speaker jacks. Use of other types of cables may result in fire.

• XLR-type connectors are wired as follows (IEC60268 standard): pin 1: ground, pin 2: hot (+) and pin 3: cold (-).

• Use only SP4 plugs for connecting SP connectors.

Maintenance

• Inspect the ventilation holes and clean them periodically. Dust and dirt can seriously degrade the effectiveness of the cooling and result in malfunction or fire.

• Remove the power plug from the AC outlet when cleaning the device.

• The performance of components with moving contacts, such as switches, volume controls, and connectors, deteriorates over time. Consult qualified NEXO-SA service personnel about replacing defective components.

Handling caution

• When turning on the AC power in your audio system, always turn on the device FIRST, to avoid speaker damage. When turning the power off, the device should be turned off LAST for the same reason.

• Do not insert your fingers or hands in any gaps or openings on the device (vents…)

• Avoid inserting or dropping foreign objects (paper, plastic, metal, etc.) into any gaps or openings on the device (vents, etc.) If this happens, turn off the power immediately and unplug the power cord from the AC outlet. Then have the device inspected by qualified NEXO-SA service personnel.

• Do not use the device for a long period of time at a high or uncomfortable volume level, since this can cause permanent hearing loss. If you experience any hearing loss or ringing in the ears, consult a physician.

• Do not rest your weight on the device or place heavy objects on it, and avoid use excessive force on the buttons, switches or connectors.

• Do not use this device for any purpose other than driving loudspeakers.

Important notice for the United Kingdom

Connecting the Plug and Cord

WARNING! THIS APPARATUS MUST BE EARTHED. IMPORTANT: The wires in this mains lead are colored in accordance with the following code:

GREEN-AND-YELLOW: EARTH
BLUE: NEUTRAL
BROWN: LIVE

WARNING: As the colors of the wires in the mains lead of this apparatus may not correspond with the colored markings identifying the terminals in your plug proceed as follows:

• The wire which is colored GREEN-and-YELLOW must be connected to the terminal in the plug which is marked by the letter E or by the safety earth symbol or colored GREEN or GREEN-and-YELLOW.

• The wire which is colored BLUE must be connected to the terminal which is marked with the letter N or colored BLACK.

• The wire which is colored BROWN must be connected to the terminal which is marked with the letter L or colored RED.

This applies only to products distributed in the United Kingdom.

Compliance information statement (Declaration of conformity procedure)

1) This device may not cause harmful interference, and

2) This device must accept any interference received including interference that may cause undesired operation. See user manual instructions if interference to radio reception is suspected.

This applies only to products distributed in the United States of America.

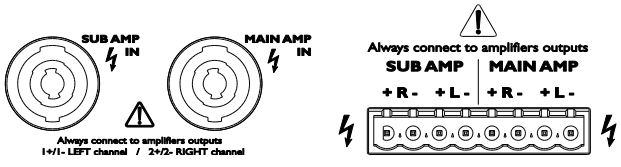
Important notice for Europe

Purchaser/User Information specified in EN55103-1 and EN55103-2.

Inrush Current: 8 A

Conforms to Environments: E1, E2, E3 and E4.

WARNING! This ϟ mark indicates a dangerous electrically live terminal. When connecting an external wire to this terminal, it is necessary either to have "a person who have received appropriate guidance on handling" make the connection or to use leads or a cord that have been manufactured in such way that the connection can be made simply and without problem.



DTD Controller introduction

Welcome to the DTD controller manual. Please take some time to read it and learn how to set up the device.

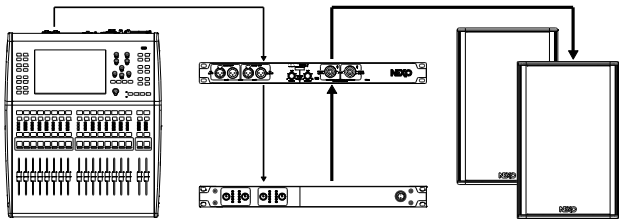
The DTD (Digital Temperature and Displacement) controller is a loudspeaker controller dedicated to Nexo speakers.

It performs as a Nexo speaker system crossover, and provides equalization, phase alignment and protection (by controlling the speaker voice coil temperature and the cone displacement).

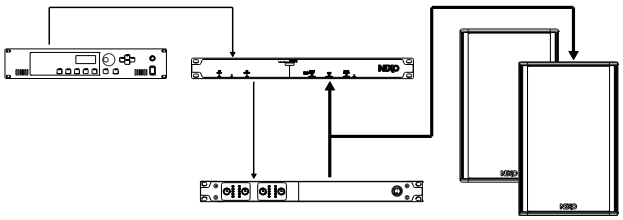
Audio Input and Output connections

How to integrate into the audio chain?

Place the DTD in the audio chain just before the power amplifiers, typically at the output of a mixing desk or a routing matrix.



Typical installation for a touring system (using DTD-T)



Typical installation for a fixed installation (using DTD-I)

Note that the outputs of the power amplifier are connected to the DTD-T, while its integrated front panel patch is used to connect to the speakers. With the DTD-I, power output of the amplifier will have to be spit in two (one side used for DTD-I feedback, the other one going to the speakers).

⚠ **WARNING!** Unplug the device from mains before connecting or disconnecting any cable to it.

The DTD can be fed through four type of audio signal:

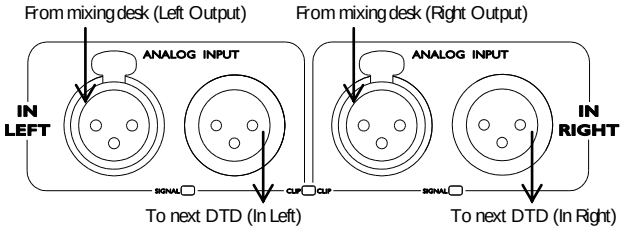
- Balanced Analog Inputs (using 24 bits / 48 to 96 KHz converters)
- AES/EBU Input (24 bits / 44.1 to 96 KHz sample rate)
- USB Audio Input (16 bits / 48 KHz sample rate)
- Dante™ Input (Optional) (24 bits / 44.1 to 96 KHz sample rate).

All audio inputs are summed together for Left and Right channel by default.

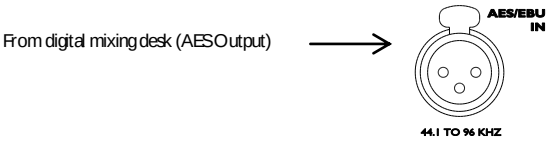
Connecting the DTD-T audio inputs

On DTD-T, use front panel female XLR3 connectors to connect the balanced analog input signal. For both channels a male XLR3 is available in parallel to link to other DTD.

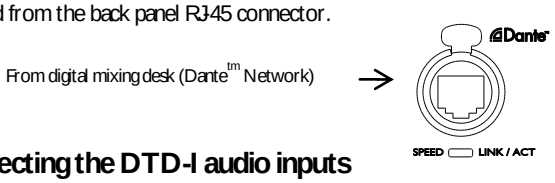
Please check your audio source manual to know how many DTD devices can be connected in parallel on its output.



AES/EBU signal can be connected to the back panel female XLR3 input.

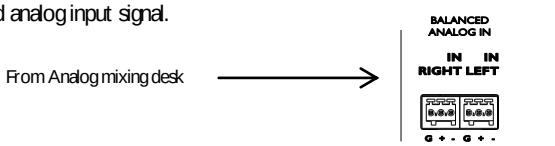


Optionally, on DTD-T-N, two channels of Dante™ streams can be received from the back panel RJ45 connector.

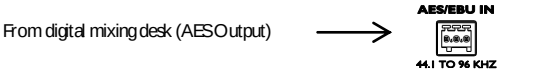


Connecting the DTD-I audio inputs

On DTD-I, use back panel terminal block connector to connect a balanced analog input signal.



AES/EBU signal can also be connected to the back panel terminal block connector.



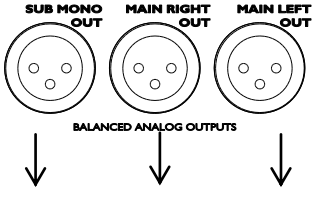
Optionally, on DTD-I-N, two channels of Dante™ streams can be received from the back panel RJ45 connector.

Connecting DTD the audio outputs

The DTD outputs must be connected to professional grade audio power amplifiers.

Up to ten amplifiers channels can be connected in parallel on one DTD output.

On the DTD-T, use the back panel male XLR3 connectors to connect the balanced analog outputs to the amplifier inputs.



On the DTD-I, use the back panel terminal block connectors to connect the balanced analog output signal to the amplifier inputs.

Amplifiers setup

Refer to the datasheet of the Nexo speaker system used with DTD and select the power amplifiers output power accordingly.

It is recommended to use only high quality, 32 dB gain amplifiers. However, the DTD controller can operate with amplifiers with gain up to 40 dB. Please check your amplifier user manual.

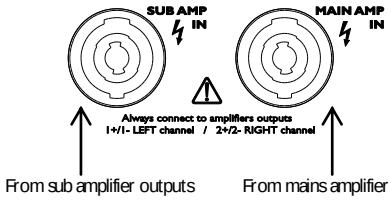
Any processing integrated on the amplifier like high-pass filter must be disabled.

⚠ **WARNING!** Do not use amplifiers that introduce latency between its inputs and outputs (amplifiers with integrated DSP for example) as it will prevent the DTD to protect the speakers.

Sensing the amplifier outputs

⚠ **WARNING!** Output of the power amplifiers must be fed back to the DTD to ensure speakers protection.

On the DTD-T, use a four wire SP4 cable to connect the output of the amplifiers to the back panel SP4 inputs.



⚠ **WARNING!** Use at least a 2.5 mm² (AWG #13) double insulated cable.

For the SP4 cable coming from the <u>mains amplifier</u>:

- *1+/1- poles must be connected to mains amp left output.*
- *2+/2- poles must be connected to mains amp right output.*

For the SP4 cable coming from the <u>sub amplifier</u>:

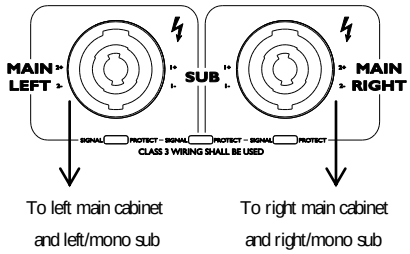
- *1+/1- poles must be connected to sub first output.*
- *2+/2- poles must be connected to sub second output.*

If only one sub channel is used (bridged amplifier for example) then connect the two poles pairs of the DTD sub amp input on this unique output:

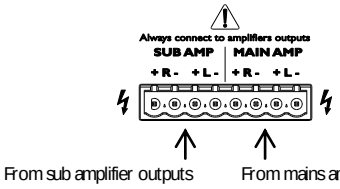
- *1+/1- poles must be connected to sub mono output.*
- *2+/2- poles must be connected to sub mono output.*

The DTD-T will pass through these signals on the front panel:

- *On the Left SP4 plug, mains amp left outputs on 2+/2- and sub amp first outputs (or mono output) on 1+/1-.*
- *On the Right SP4 plug, mains amp right outputs on 2+/2- and sub amp second outputs (or mono output) on 1+/1-.*

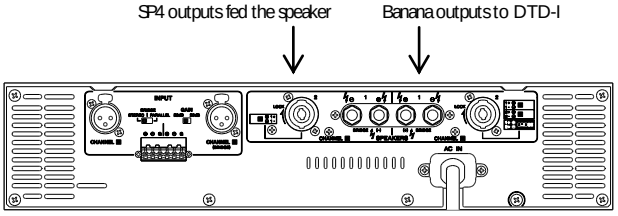


On the DTD-I, use a four wire speaker cable to connect the output of the amplifiers to the back panel terminal block connectors.



⚠ **WARNING!** Use at least a 0.5 mm² (AWG #20) double insulated cable.

On amplifiers with two kinds of output connectors, one kind can be used to connect the DTD-I amplifier sensing inputs while the other can be used for connecting the speakers if not then a Y connection should be used.



- Connect the + and – poles for the Mains (left and right) amplifier sensing to the Mains power amplifier outputs.
- Connect the + and – poles for the Sub amplifier sensing to the Sub power amplifier outputs. The two poles pairs should be connected even if only one channel of amplifier is used for the sub (bridged amplifier for example).

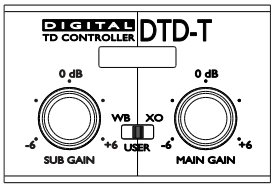
Front panel interface

Graphical OLED display

The DTD uses a high luminosity graphical OLED display to show the speaker setup running into the unit.

Front Panel Controls (DTD-T only)

Two rotary control knobs and a three position switch are available on the front panel of the DTD-T.



- Use the sub gain control to adjust the sub channel output level between -6 and + 6 dB.
- Use the main gain control to adjust the main channels output level between -6 and + 6 dB.

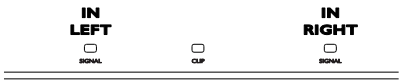
Use the switch to select between the speaker system options:

- "WB" (Wideband) means the Main outputs are full range (no high-pass) typically for use without sub.
- "XO" (Crossover) means the Main outputs are high-pass typically for use with sub.
- The "User" position is used for advanced settings (delay, EQs, user limiters) set up from remote control software. See dedicated manual.

Note that using the mains speakers in XO mode will increase maximum output level of the Main speaker while producing less low end.

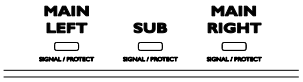
Front panel indicators

On each input a green signal LED will light if a signal is fed into the controller, from any input, analog, AES or Dante™ (optional).



A center red clip LED will inform the user that at least one analog input of the controller is clipping: reduce then audio source level to prevent distortion.

On each output a green signal LED will light if a signal is fed into the DTD though the amplifier feedback input.



On each output a yellow signal LED will light if the controller is limiting its output to protect the speaker.

Connecting the speakers

Please refer to the Nexo speaker set user manual for proper connection.

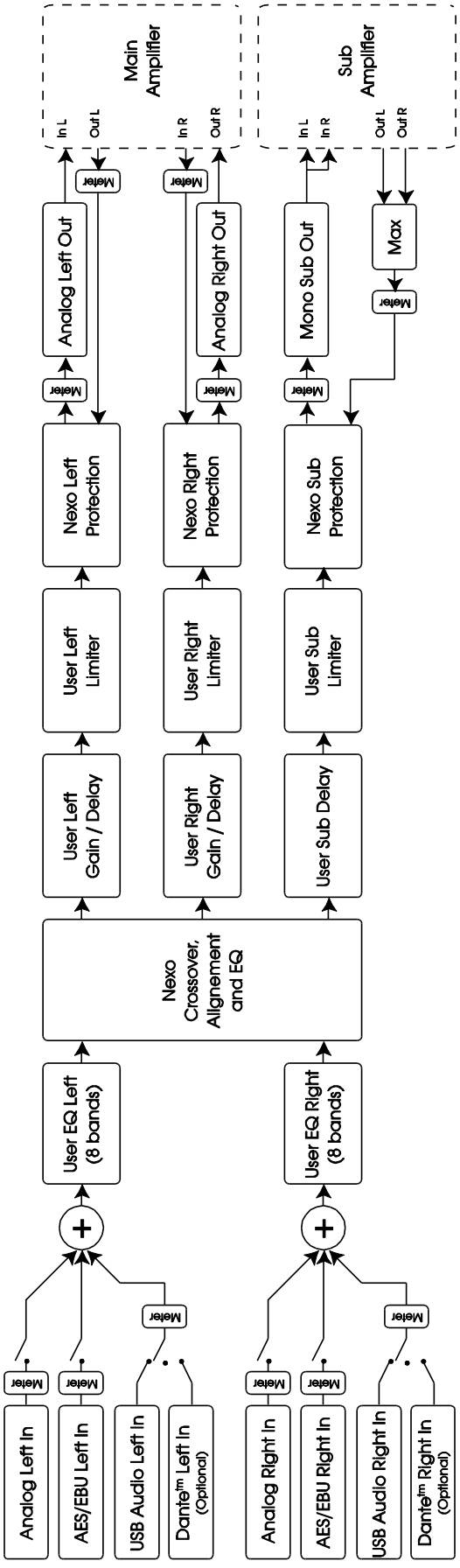
Starting up the system

Before powering the DTD, be sure all amplifiers are OFF and that the audio source is muted.

- Power ON all audio equipment before the DTD, eventually wait for boot up.
- Power ON the DTD controller.
- Power ON the power amplifiers and set the output volume to – 20 dB.
- Send some audio signal into the system and check that the sound is outputting from the speakers (check left/right and sub output).
- If everything seems OK turn slowly the attenuator of the amplifiers to the 0 dB position.

The system is now ready to be used.

Block Diagram

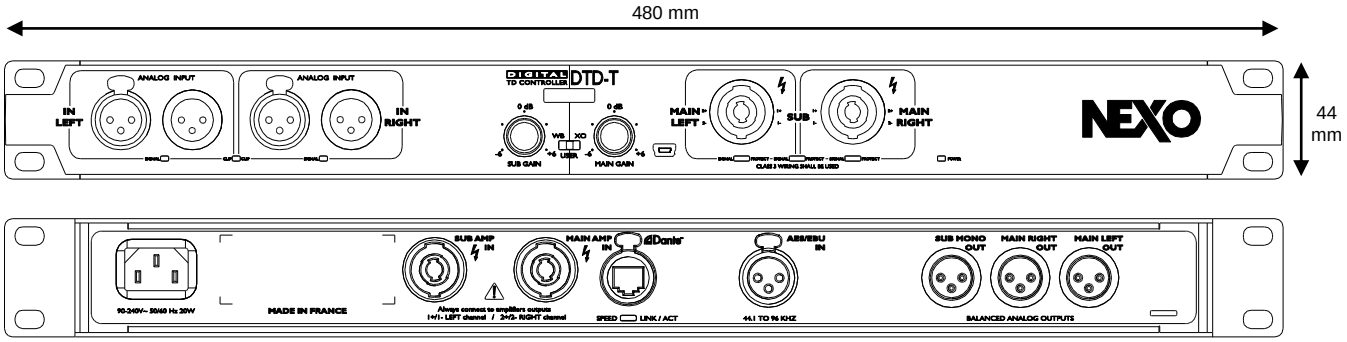


Specifications

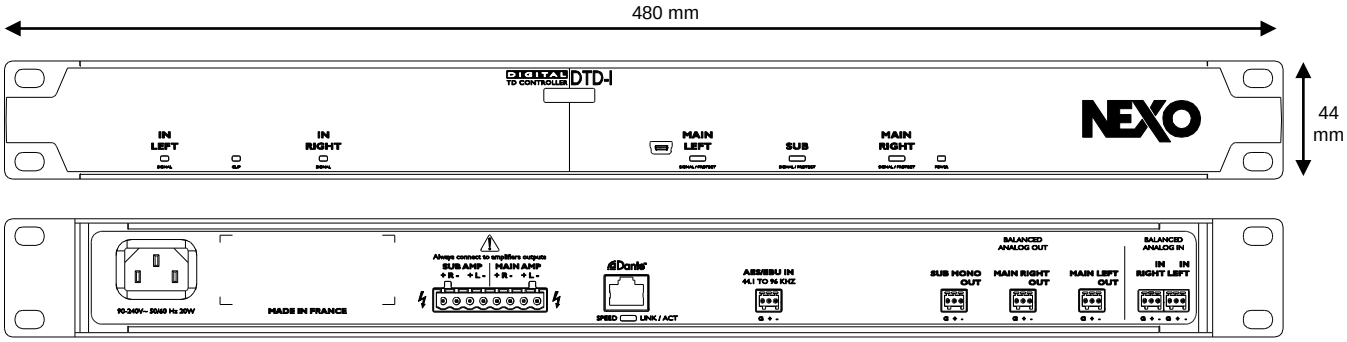
	DTD-T-U	DTD-T-N	DTD-I-U	DTD-I-N
Electrical Specifications				
Sampling frequency and resolution	48/96 KHz, 64 bits internal processing precision			
Signal delay	Less than 1 ms (analog in to out) on flat setup, compatible with NXAMP latency			
Frequency response	20 Hz to 20 KHz, +/- 0.5 dB (mains out)		20 Hz to 2 KHz +/- 0.5 dB (sub out)	
Total harmonic distortion	Less than 0.05 % (mains out)		Less than 0.02 % (sub out)	
Dynamic range	112 dB (A weighted, mains out)		105 dB (A weighted, sub out)	
Crosstalk / Channel separation	-100 dB (1 KHz)			
Indicators	Input signal/peak (green/red), amp in signal (green), speaker protect (yellow), power (blue)			
Display	White backlight graphical OLED display 96 x 16 pixels			
Switch and rotary knobs	3 position switch + 2 x rotary knobs			
Analog Inputs Characteristics				
Number of channels	2 electronically balanced analog inputs			
Connectors	2 x XLR-F with link on XLR-M		2 x terminal block (3-pin / 2.54 mm pitch)	
Sampling frequency and resolution	48 to 96 KHz / 24 bits			
Max. input level / Input impedance	+22 dBU / 20 KOhms			
Analog Outputs characteristics				
Number of channels	3 electronically balanced analog outputs			
Connectors	3 x XLR-M		3 x terminal block (3-pin / 2.54 mm pitch)	
Sampling frequency and resolution	48 to 96 KHz / 24 bits			
Max. output level / Output impedance	+22 dBU / 200 Ohms			
Amplifier Sensing Inputs				
Number of channels	4 floating electronically balanced high voltage analog inputs			
Connectors	2 x 4 pole SP4 connectors		1 x terminal block (8-pin / 5.08 mm pitch)	
Sampling frequency and resolution	48 to 96 KHz / 24 bits			
Max. input level / Input impedance	+50 dBU (8000 Watts / 8 Ohms) / 364 KOhms			
AES input characteristics				
Number of channels	1 x AES/EBU stereo digital input			
Connectors	1 x XLR-F		1 x terminal block (3-pin / 2.54 mm pitch)	
Sampling frequency and resolution	44.1 to 96 KHz / 16, 20 or 24 bits			
Dante™ input characteristics				
Number of channels		2 x Dante™ channels		2 x Dante™ channels
Connectors		1 x ruggedized RJ45		1 x RJ45
Sampling frequency and resolution		48-96 KHz / 24 bits		48-96 KHz / 24 bits
USB input characteristics				
Type	2 channels of asynchronous USB audio			
Connector	Female mini USB connector type B			
Sampling frequency and resolution	48 KHz / 16 bits			
Remote control				
Connector	Mini USB	Mini USB + RJ45	Mini USB	Mini USB + RJ45
Physical Specifications				
Dimensions (W x H x D)	480 (W) x 44 (H) x 65 (D) mm, 19 inches / 1U			
Weight	1.3 Kg			
Power supply voltage	90 – 240 V 50/60 Hz			
Power consumption	20 W max			
Heat dissipation (per hour)	20 Kcal max			
Operating Temperature Range	0° C – 40 ° C			
Storage temperature range	-20 ° C – 60 ° C			
Included items	Owners's manual		Owners's manual + terminal plugs	
Ordering Information				
Ordering Code	DTD-TU	DTD-TN	DTD-IU	DTD-IN

Drawings and dimensions

DTD-T model



DTD-I model



Declaration of conformity (DoC)

We,

NEXO S.A.
ZA du Pre de la Dame Jeanne
60128 Plailly
France

Declare under our sole responsibility that the products

Professional Audio Equipment

Model:	**DTD-T-U, DTD-T-N, DTD-I-U, DTD-I-N**
Manufacturer name:	**NEXO S.A.**
Manufacturer address:	**ZA du Pre de la Dame Jeanne, 60128 Plailly, France**
CE Mark first affixed in:	**2015**

to which this declaration relates is in conformity with the following standard(s) or other normative document(s)

EN 55103-1:2009 / EN 55103-2:2009 / J55013 (H22)

EN61000-3-2:2006 + A1:2009 + A2:2009 / EN61000-3-3:2008

FCC Part 15 :2013

IEC 60065:2001 (Seventh Edition) + A1:2005 + A2:2010

CSA 60065-03 + Am 1(2006) / UL 60065 / K06065 / J60065 (H23)

Plailly, France

Date: September 18, 2015

Joseph CARCOPINO
R&D Director, NEXO