

Audio over IP Routing System

IP based multichannel Audio Network



NETBOX DSP

Dante™ and AES 67-compatible
AoIP router with mixing
and processing capabilities



Audio inputs and outputs
through AoIP network



EQUIPMENT DESCRIPTION

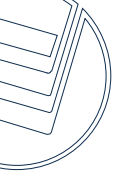
The NETBOX DSP is able to receive audio from the Dante network and then return it, mixed and processed, to be used in another device or subsystem. It can also generate test signals and vumeters. Effectively, it is audio matrix for AoIP networks.

NETBOX DSP can be used in combination with any AEQ or third-party device from more than 350 manufacturers which are compatible with Dante AoIP protocol.

NETBOX DSP also incorporates 16 GPI and 16 GPO (each GPIO connector includes a power supply pin in order to feed external circuitry). GPIO can also be transported through the IP network between compatible devices. This way, a GPIO can drive the GPOs in different piece of equipment.

FUNCTIONAL FEATURES

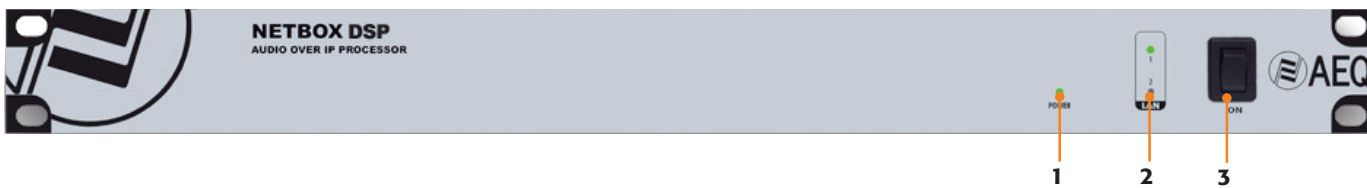
- Routing and mixing capabilities on 64, 96, 128 or 160 inputs to any of the 64, 96, 128 or 160 outputs in the AoIP network, respectively, as a function of the particular configuration.
- Processing capability on any 64 inputs to 64 AoIP outputs. The available processes are:
 - Frequency: high-pass, low-pass and band-pass filters, 4-band parametric equalizer
 - Dynamics: compression, expander, noise gate, limiter and DLP combinations.
 - Delay.
 - Vu-meter generation.
 - Test tone generation
- Audio extraction from any node in the network
- Publishing of its output in the network.
- Mixing of any input combination on each output with independent relative gains.
- 16 GPI and 16 GPO with control and signaling transport between different devices.



NETBOX DSP

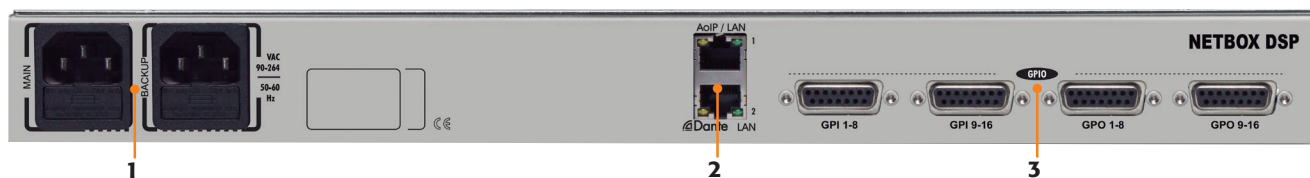
Front and Back panels

Front Panel Elements



- 1 Power-ON LED.** Indicates the device's power supply status.
- 2 LAN LEDs.** Indicate the status connection of the audio over the following local area network ports: LAN 1 (main interface) and LAN 2 (secondary interface).
- 3 Power switch.**

Rear Panel Connectivity



- 1 Power input:** The power supply connectors are located in the back left area of the unit. The power supply is redundant and autoranging.
- 2 Ethernet ports (LAN 1 and LAN 2).** NETBOX DSP features two Ethernet ports: LAN 1 must always be wired, while LAN2 is to be connected only when the system is configured in "Daisy Chain" mode or a redundant system is set up.
- 3 GPIO connectors (DB15).** NETBOX DSP includes two of these connectors including 8 GPI each, and another two with 8 GPO each. All the connectors have a common ground and provide a 5V reference signal. Thanks to the open protocol implemented, operation with third-party devices is possible, allowing GPI and GPO transportation between systems using the IP network.

Comments on Netbox DSP GPIO Wiring

AEQ simplifies installation by simplifying the wiring between the system and connected devices. The "CP CAB GPIO" accessory is provided on-demand. It consists on a DB15 male connector soldered to a 15-way, 6-meter long cable, which no connectors in the other end, for GPI and GPO usage. Each cable allows for the connection of the 8 GPI or 8 GPO provided in each device's connector.





Netbox DSP operates as a audio matrix using "Netbox RTC" real time control software.

Netbox RTC application (Figure 1)

Running over Windows operating systems, it performs the following features:

- Routing with audio mixing and distribution coming from mono or stereo Dante inputs, delivering them to Dante outputs. It may be complemented with Netbox 4 MH, Netbox 8 AD or Netbox 32 AD whenever analogue, digital i/o, microphone inputs or headphone outputs are required.
- Audio processing: this device can apply one or more processes to each of its 64 inputs.
 - High pass filter
 - Low pass filter
 - Band pass filter
 - 4-band parametric equalizer
 - Compressor
 - Expander
 - Limiter
 - DLP
 - Noise Gate
 - Delay
 - Reverb
- Configuration and scheduling salvo management.
- Multi-user and multi-device control. Different views and particular scenarios can be configured, and critical lines can be protected.
- Dante signals are routed within the IP network using "Dante Controller".

Netbox DSP also operates with the following applications:

"Dante Controller" application (Figure 2)

Running over Windows operating system, offering the following features:

- View all Dante-enabled audio devices and their channels on the network.
- View Dante-enabled device clock and network settings.
- Route audio on these devices, and view the state of existing audio routes.
- Lock and unlock Dante devices.
- Change the labels of audio channels.
- Customize the receive latency (latency before play out).
- Save audio routing presets.
- Apply previously saved presets.
- View and set per device configuration options.
- View network status information, including: multicast bandwidth across the network and transmit and receive bandwidth for each device.
- View device performance information, including latency statistics and packet errors.
- View clock status information for each device, including frequency offset history and clock event logs.

Netbox Tool application

Setup wizard running over Windows operating systems, offering the following features:

- IP configuration and synchronization.
- Input and output gains control, stereo pairings and phase (Figure 3).
- GPIO configuration (Figure 4), selection of the network devices receiving its GPI and pairing of physical and virtual GPIO (Figure 5).
- IP addresses configuration to send the vumeters.

More information can be found in the specific documentation.

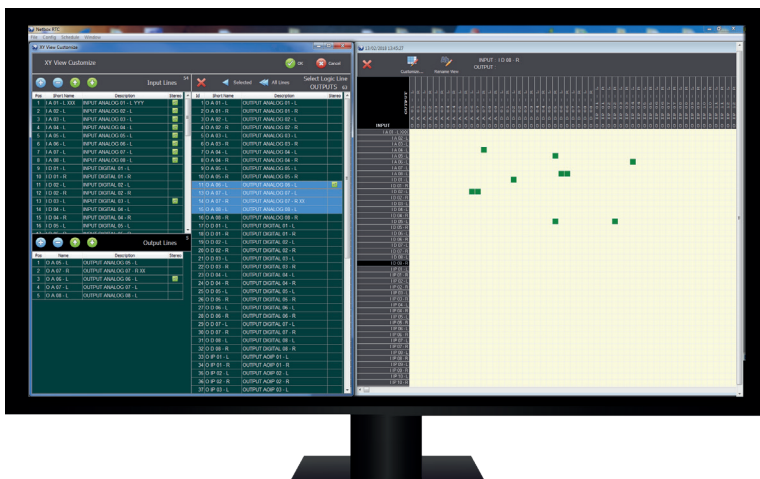


Figure 1. Netbox RTC

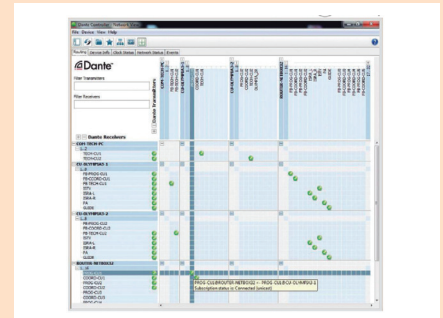


Figure 2. Dante Controller.

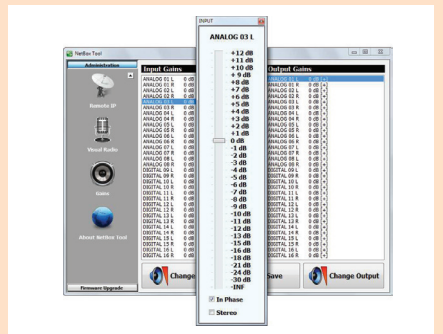


Figure 3. Audio gain adjustments in Netbox Tool.

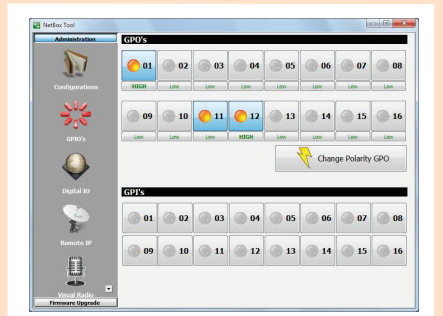


Figure 4. GPIO configuration.

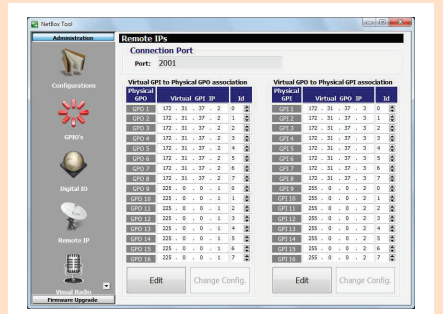


Figure 5. Network GPIO pairing.



TECHNICAL SPECIFICATIONS

Inputs and outputs:

NETBOX DSP has between 64 and 160 Dante inputs and outputs, depending on the particular version. Up to 64 inputs can be processed and returned to an output, or summed to any other existing output. This means that up to 64 inputs can be processed per device.

Processes:

NETBOX DSP can apply one or more processes to each of its 64 inputs:

- High pass filter
- Low pass filter
- Band pass filter
- 4-band parametric equalizer
- Compressor
- Expander
- Limiter
- DLP
- Noise gate
- Delay
- Reverb

Mixing:

Apart from its processing capabilities, NETBOX DSP can also mix any of its inputs to any output. This means that any set of inputs (up to 160 depending on the particular configuration) can be mixed to any of the outputs. Each output gain can be individually adjusted. They can also be muted.

GPIOs:

NETBOX DSP provides 16 physical GPI into 2 DB15 connectors, 16 physical GPO in two DB15 connectors and 256 virtual GPO that may be used to perform any of the following functions:

- Signalling transport between devices
- Alarm signaling
- Activation or de-activation reporting for any process
- Informing about audio absence at any input
- Informing about audio absence in any output
- Remote activation or deactivation of any process
- Remote activation or deactivation of any test generator
- Remote muting of any output
- Activation and triggering of macros and salvos

Physical GPI and GPO are standard GPIO, while virtual GPIO use AEQ's proprietary protocol, that is also starting to be implemented by several integrators. GPIO can also be transported through the IP network between compatible devices. This way, a GPI can drive GPOs in other equipment. This is what we call in AEQ "Virtual GPIO".

Test and Monitoring:

It is possible to display each input or output level using Vumeters. This allows the metering of inputs (before processing) and outputs (once processed).

The following test signals can be applied to any output:

- Test tone
- Pink noise
- White noise

DANTE™ Network Technology:

- Data format: Dante Audio over IP technology. AES 67 compatible
- Plug-and-play technology - automatic detection of the hardware and simple audio routing.
- Precise sample-level synchronization, even through several switches.
- Very low and deterministic delay in the entire network.
- Flexible and scalable network topology, supporting a great number of audio transmitters and receivers.
- Supports a single integrated network used for audio, video, control and monitoring. Compatible with other kinds of traffic using QoS management.
- Uses low-cost, off the self network infrastructure.
- 24-bit, 48 KHz. audio resolution.
- Delay: 1-2 ms (@ 48 KHz typical, depending on network performance and complexity).
- 2 RJ45 Ethernet ports per interface, 1000 BASE-T, transformer isolated, that can be used for redundancy or daisy-chain connections.
- Binary rate: 100/1000 Mbps.
- Maximum segment length: 100 m max. over CAT5e or better cabling.

Redundancy:

- The device features a redundant power supply. In case that one of them stops receiving mains or fails, the system is fed by the other one without any operation disruption.
- NETBOX 64 DSP includes two Ethernet ports. These may be configured in "Daisy Chain" mode, Primary/Secondary or Master/Slave modes.
- When Primary/Secondary redundancy mode is configured, the device uses Dante native redundancy system, which allows for Primary/Secondary failover without losing audio samples.

GENERAL SPECIFICATIONS

Dimensions and weight:

- 44 x 356 x 482 mm; 1.73 "x 14" x 19 " (single rack unit height). 3,5 kg (7,7 lbs).

Power supply:

- Internal redundant power supply (90 - 264V AC, 47-63Hz).

Cooling:

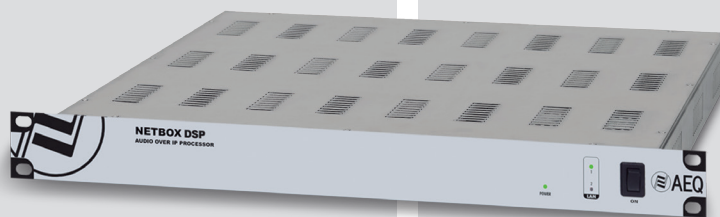
- Absolutely quiet natural convection cooling system, compatible with studio operation.

Temperature range:

- 0 to + 45 ° C (32 to 114 ° F).

Versions:

- Netbox DSP 64: Process 64 signals, route and mix 64 signals.
- Netbox DSP 96: Process 64 signals, route and mix 96 signals.
- Netbox DSP 128: Process 64 signals, route and mix 128 signals.
- Netbox DSP 160: Process 64 signals, route and mix 160 signals.



INTERNATIONAL SALES

Margarita Salas, 24
 28919 Leganés · Madrid · Spain
 Tel.: +34 91 686 13 00
 Fax: +34 91 686 44 92
 website: www.aeq.eu
 e-mail: aeqsales@aeq.es

AEQ - USA

Tel.: +1 (954) 581 79 99
 e-mail: sales@aeqbroadcast.com

AEQ - PORTUGAL

Tel.: +35 1 261 101 874
 e-mail: apicarra@aeq.es

AEQ - KROMA MEXICO

Tel.: +55 54132716
 e-mail: creyna@aeq.es

AEQ - CATALUNYA

Tel.: +34 93 414 03 96
 e-mail: nolivella@aeq.es