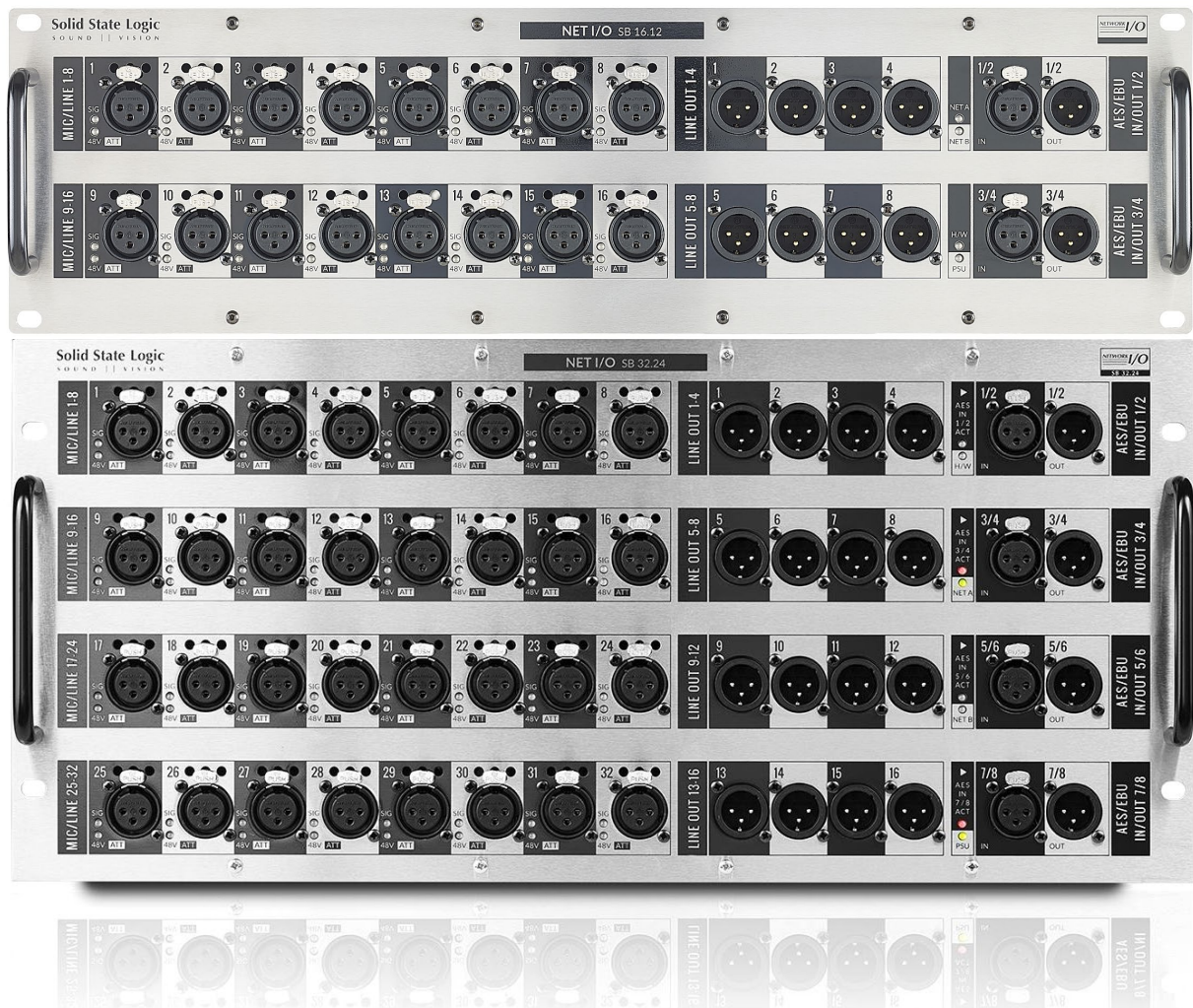


SB 32.24 and SB 16.12

Network I/O

User Guide

Revision: 1.5



Solid State Logic
OXFORD • ENGLAND

Solid State Logic

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E&OE

May 2021

Document Revision History

Revision 1.1		June 2017
Revision 1.2		July 2017
Revision 1.3	Addition of SB 16.12	February 2019
Revision 1.4	Minor additions	February 2019
Revision 1.5	Network I/O Controller update and addition of SRC on Network B	May 2021

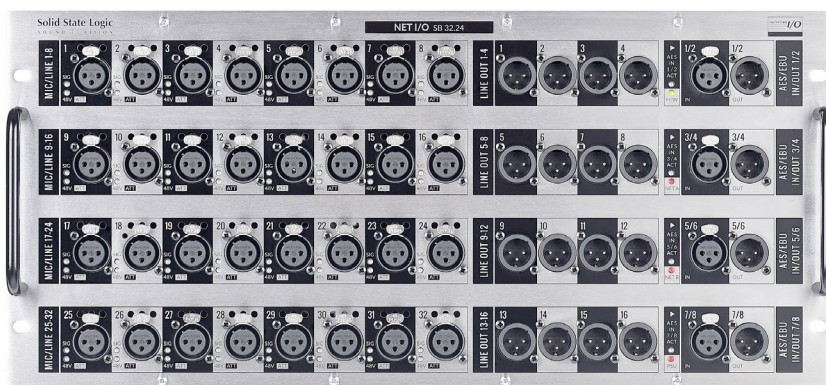
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Introduction

Overview

SB 32.24 is a 5U, 40-input and 24-output Dante stagebox featuring 32 SuperAnalogue™ mic/line inputs, 4 AES/EBU inputs, 16 analogue line outputs and 4 AES/EBU outputs.



SB 16.12 is a 3U, 20-input and 12-output Dante stagebox featuring 16 SuperAnalogue mic/line inputs, 2 AES/EBU inputs, 8 analogue line outputs and 2 AES/EBU outputs.



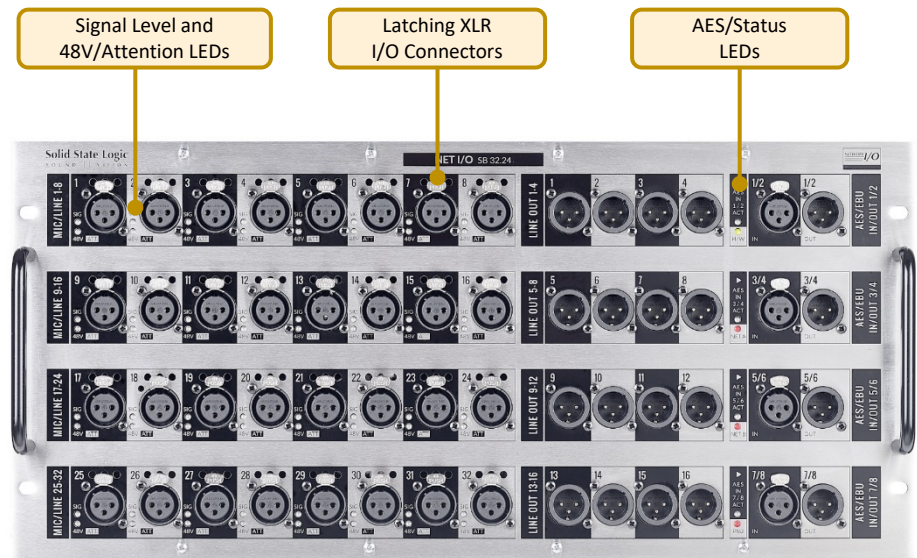
Both SB 32.24 and SB 16.12 can be controlled remotely from SSL Live and System T consoles as well as from SSL's Network I/O Controller app for PC.

SB 32.24 and SB 16.12 are suitable for all studio and stage applications of any scale. Featuring redundant power, redundant ruggedised Neutrik etherCON® network connections plus two user-specifiable SFP ports which provide network extension or support a second independent Dante network. All analogue and AES audio connectors are XLR-3 type.

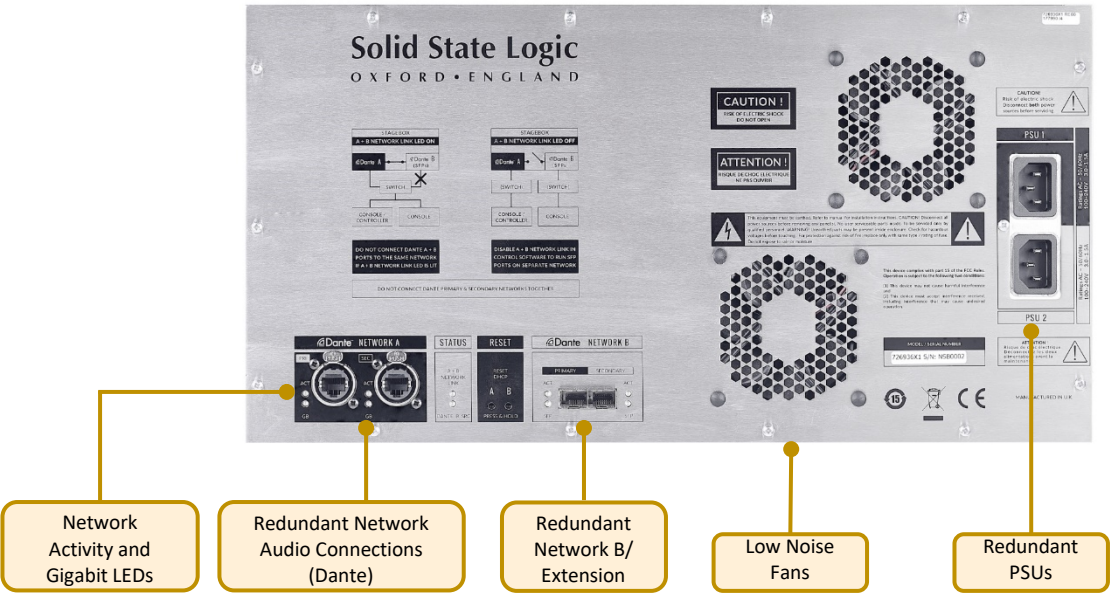
Key Features

- Interface between studio/stage/recording-area and IP audio networks using Dante and AES67
- SSL SuperAnalogue studio grade preamps
- Gain-compensated Dante Split available on the same or separate (B) network
- Device and parameter ownership assignment to avoid control conflicts
- Redundant PSUs and Dante network connections
- Redundant network extension/network B SFP ports with optional sample rate conversion (SRC)
- Clear front panel indication – signal present, phantom power, channel attention on analogue inputs
- Front facing XLR connections

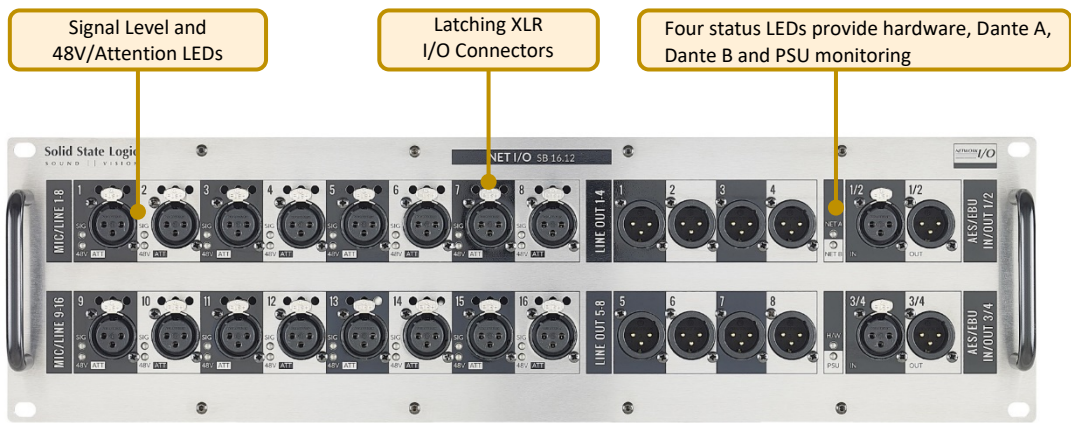
SB 32.24 Front Panel



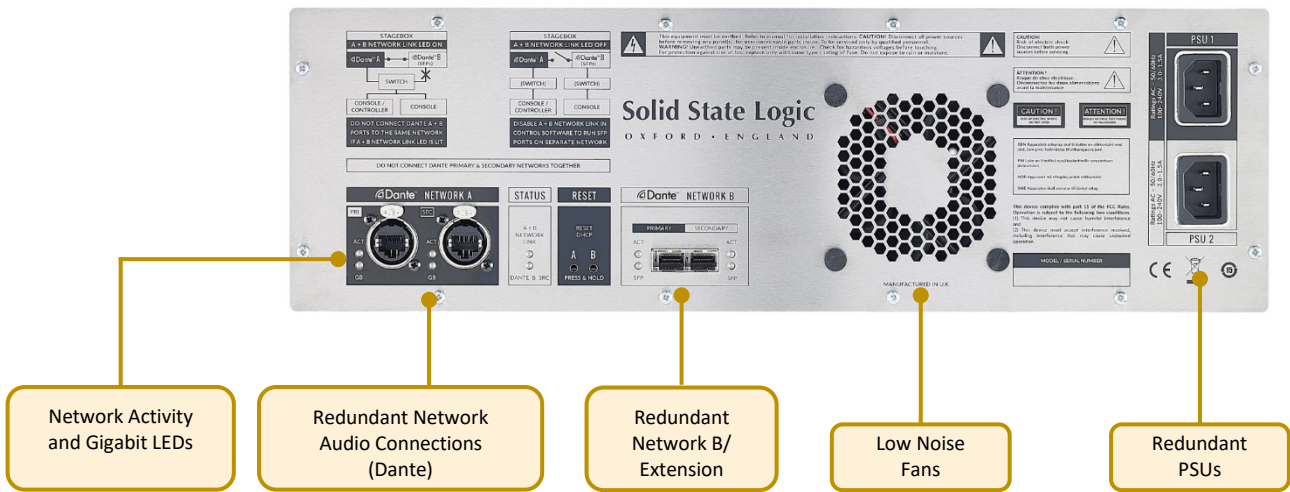
SB 32.24 Rear Panel



SB 16.12 Front Panel

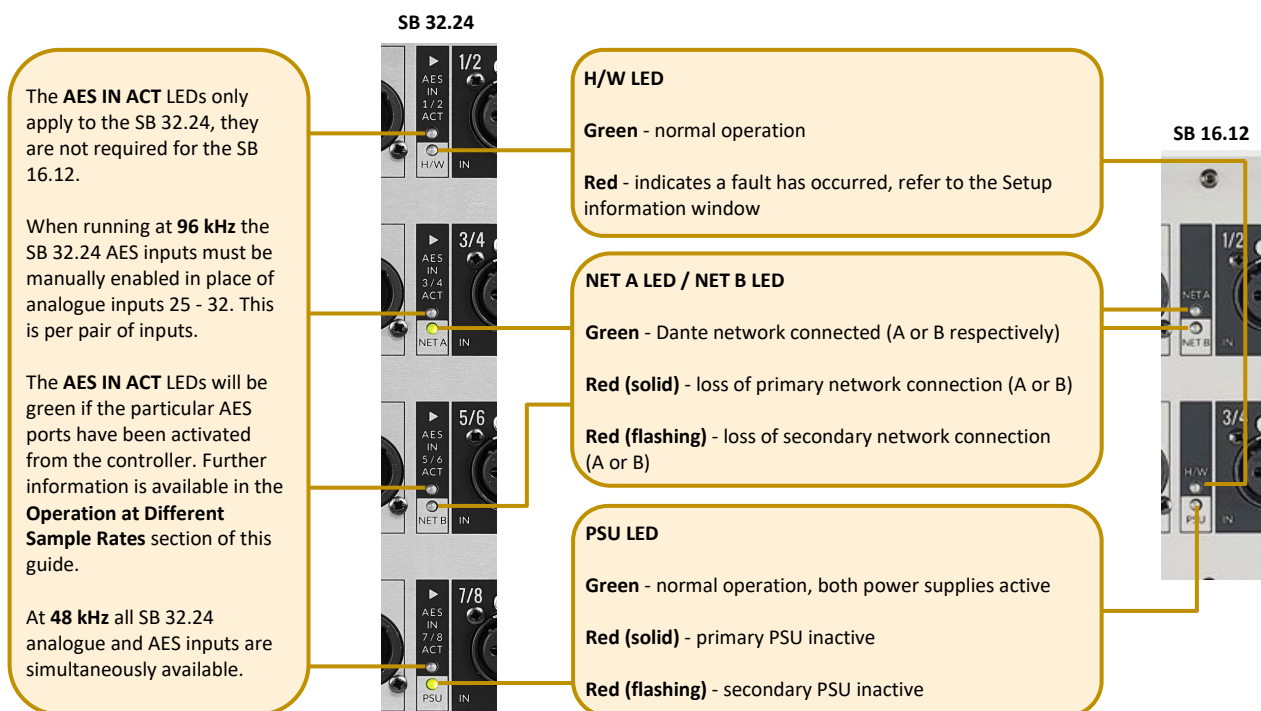


SB 16.12 Rear Panel

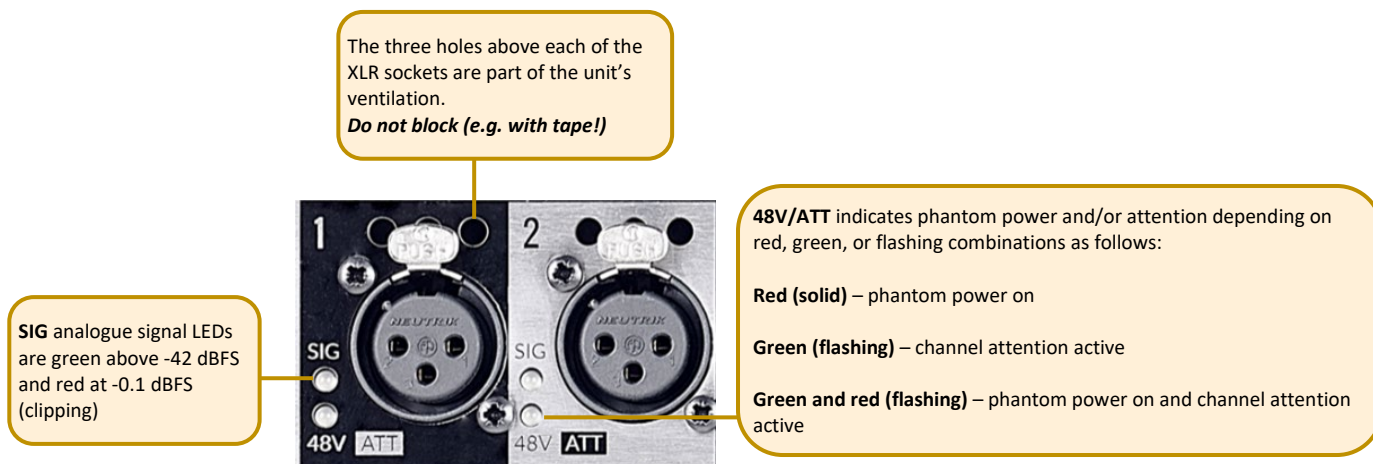


Status LEDs

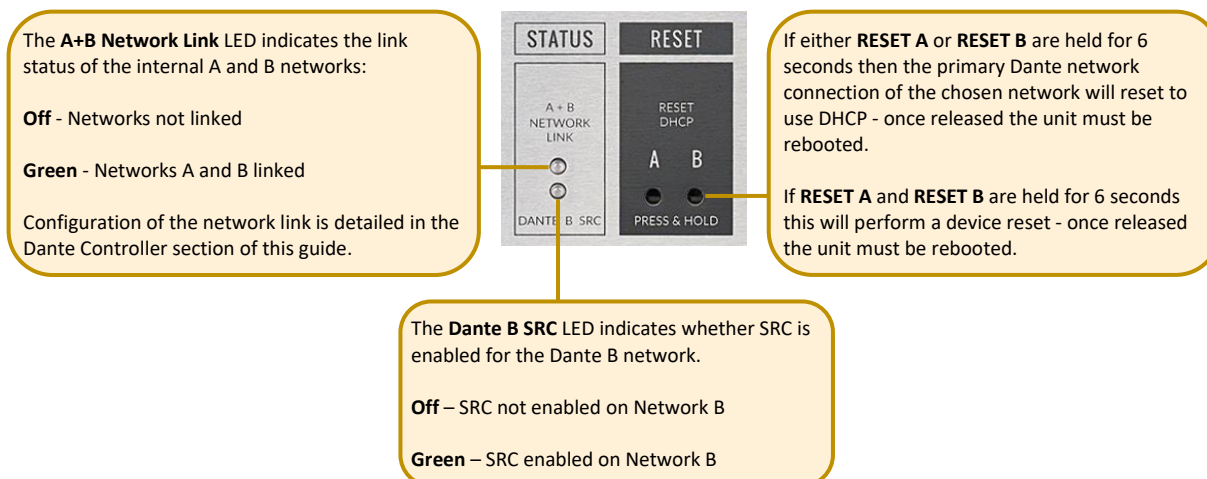
A series of LEDs towards the right hand side of the front panel indicate statuses as follows.



Channel LEDs



Status and Reset



Device Reset

Performing a device reset will clear the SSL device settings. This includes ownership states and input settings. This does not clear Dante Brooklyn card settings.

Brooklyn Reset

Resetting the Dante Brooklyn card to default settings is performed from Dante Controller. Under the **Device Config** tab for a device select **Clear Config**. This clears the device name, channel labels, IP address settings, sample rate, latency and existing audio routes. This does not clear SSL Ownership settings.

Hardware Connections:

Mains Power Connections

Each stagebox includes redundant PSUs with IEC C14 inlets. Either supply can individually power the unit. Ideally these should be connected to separate power circuits to provide redundancy of incoming AC power.



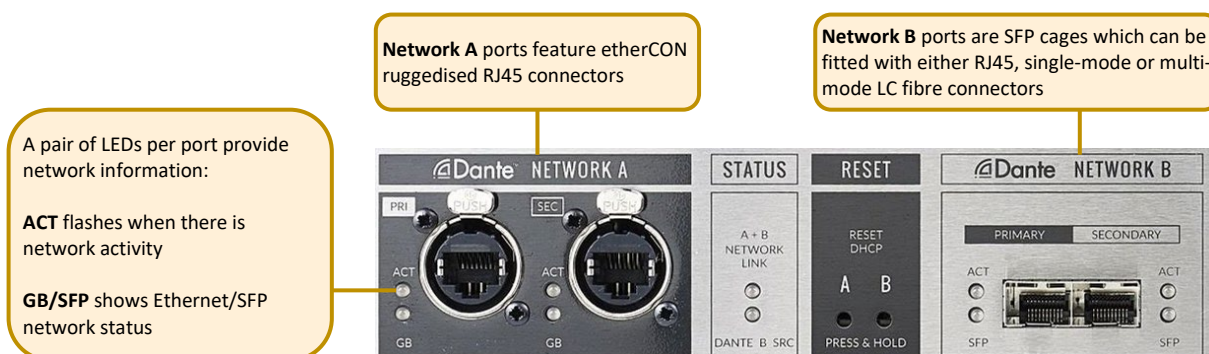
Audio Inputs and Outputs



Electronically balanced mic/line inputs, line outputs, AES/EBU inputs and outputs on latching XLR-3 connectors.

See [Appendix B](#) for pinout information.

Dante Connections



The SB 32.24 and SB 16.12 have two sets of redundant network connections. These can be configured in two different modes:

In the first mode, the A and B networks are linked internally (**A+B Network Link** LED is on). In this mode both Network A and Network B are identical and output both the gain-dependant and gain-compensated audio. Dante devices can subscribe to either one. Either set of network connections (or both) can be used to connect to the stagebox, allowing Ethernet or fibre connectivity as desired.

In the second mode, the A and B networks are discrete (**A+B Network Link** LED is off) and isolated from each other. In this mode Network A transmits uncompensated audio (and receives audio for the analogue outputs, AES outputs and also control data) and Network B transmits the compensated audio only. An SRC can be enabled on Network B if required. Further information can be found in the [Gain Compensation](#) and [Network B Sample Rate Converter \(SRC\)](#) sections of this guide.

Configuration of the network link is detailed within the [Dante Controller](#) section of this guide.

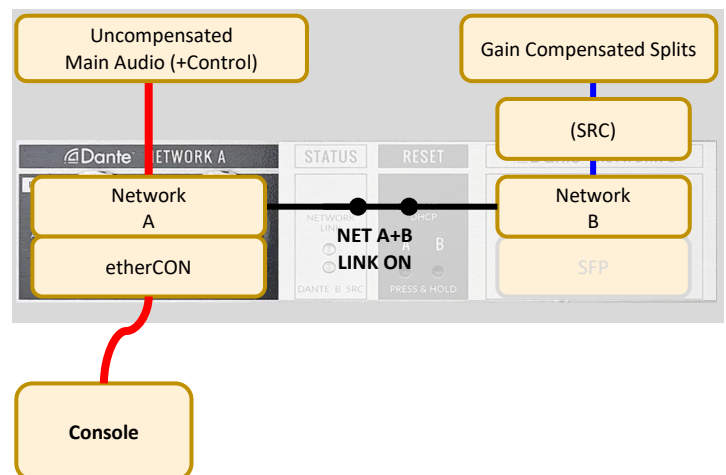
Dante Connection Examples

The following examples demonstrate common network configurations and the required setting for the **A+B Network Link**, note this is not an exhaustive list. Only two consoles are shown for simplicity, these examples would also apply for multiple console networks, or networks with additional I/O devices sending/receiving signals directly to/from the SB 32.24 or SB 16.12.

Typically the master console will have control of the stagebox inputs. Additional consoles or I/O devices can subscribe to either the uncompensated or gain-compensated splits depending on the usage requirements and network link configuration. Further information can be found in the [Gain Compensation](#) and [Ownership](#) sections of this guide.

Gain-Dependant Source and Gain-Compensated Splits Available to One Console

In this example with a single console, both the gain-dependant and the gain-compensated splits are available to the console. Stagebox outputs are also available to the console.

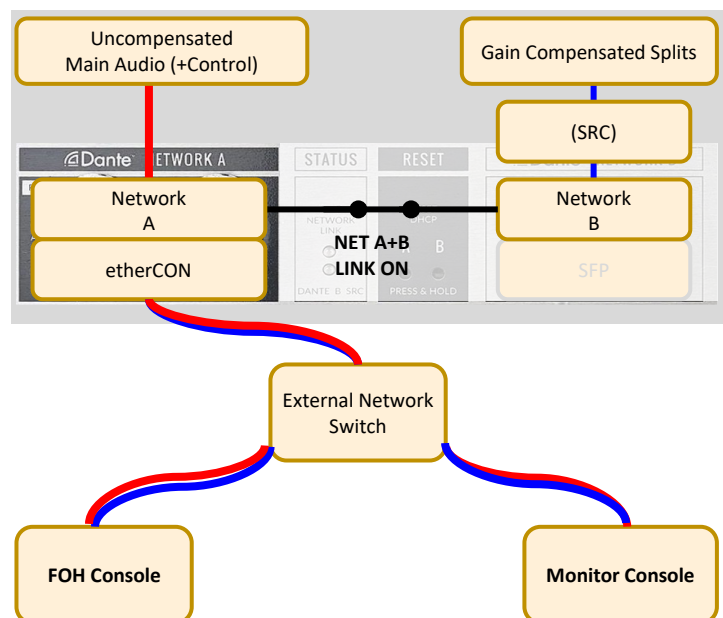


Gain-Dependant Source and Gain-Compensated Splits Available to Two Consoles (No SFPs Fitted - External Switch Connected)

In this example, a FOH and monitor console are both connected to the stagebox via an external network switch. Both the gain-dependant and the gain-compensated splits are available to both consoles through the Network A connections, no SFPs are required. The Network B SFP connections could be used instead if a direct fibre connection was preferred.

Input ownership and stagebox outputs are available to either console.

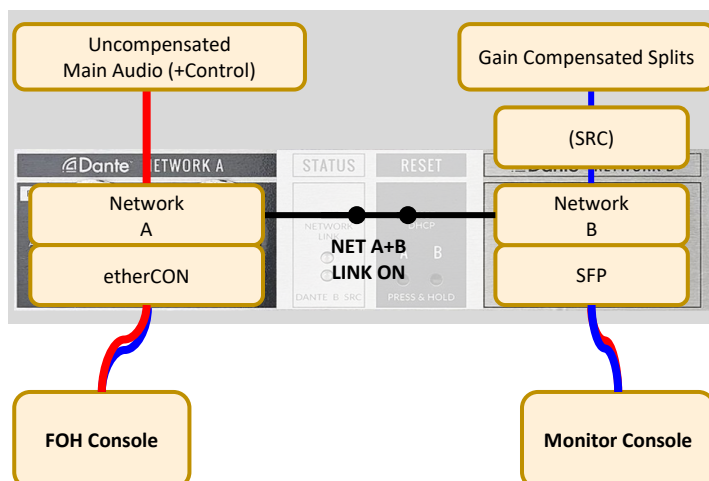
SRC can be enabled on Network B if required. Further information can be found in the [Network B Sample Rate Converter \(SRC\)](#) section of this guide.



Gain-Dependant Source and Gain-Compensated Splits Available to Two Consoles (SFPs Fitted)

In this example, FOH and monitor consoles are both connected to the stagebox directly, using Network A (etherCON) and Network B (SFP) connections respectively. Both the gain-dependant and the gain-compensated splits are available to both consoles. Input ownership and stagebox outputs are available to either console.

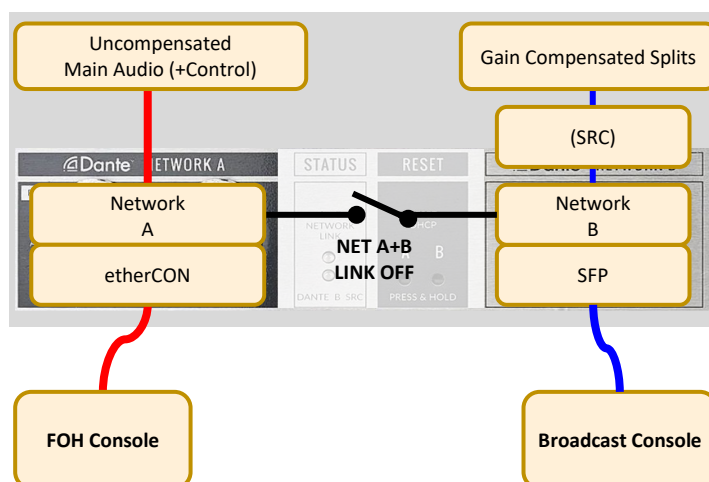
SRC can be enabled on Network B if required. Further information can be found in the [Network B Sample Rate Converter \(SRC\)](#) section of this guide.



Gain-Dependant Source Available to Main Console, Gain-Compensated Split Available to Separate Network

In this example only the gain-dependant split is available to the FOH console. Only the gain-compensated split is available to the separate network (B), here being used for a broadcast split. Input ownership and stagebox outputs are only available to the FOH console.

SRC can be enabled on Network B if required. Further information can be found in the [Network B Sample Rate Converter \(SRC\)](#) section of this guide.



Network B Sample Rate Converter (SRC)

A Sample Rate Converter (SRC) is available on the Network B Dante ports, allowing the gain compensated split outputs to run at a different sample rate or in a different clock domain to the main network.

Example applications are shown below, note this is not an exhaustive list. Both Network A and Network B can operate at any of the available sample rates (44.1, 48, 88.2 or 96 kHz). Sample rate selection for each device is configured from the Device Config tab within Dante Controller.

Network B SRC is enabled from the device Setup tab within Network I/O Controller.

N.B. If **Network B SRC** is disabled then both Dante networks (Network A and Network B) must be running at the same sample rate and synchronised to the same clock source.

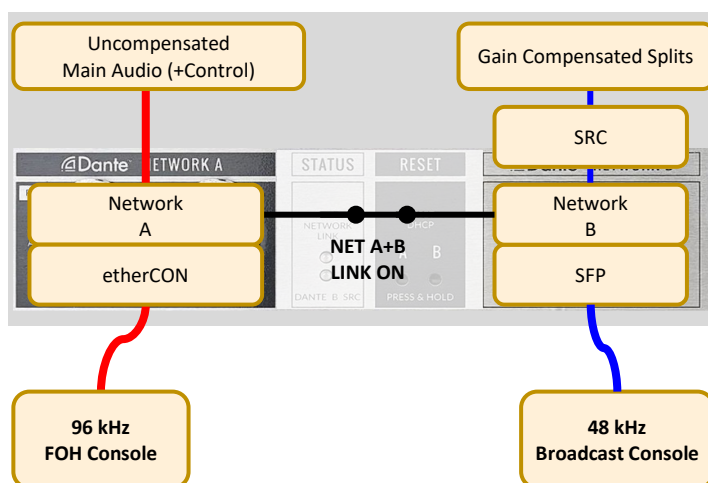
Sharing Signals Between Consoles Running at Different Sample Rates

For events where a Front of House console is operating at 96 kHz and a broadcast is simultaneously being produced at 48 kHz. Alternatively for situations where additional networked consoles cannot operate at 96 kHz.

Network A is set to 96 kHz. The FOH console subscribes to the main audio channels and has ownership of the mic preamps.

Network B is set to 48 kHz and **Network B SRC** is enabled. The broadcast console subscribes to the gain compensated split outputs available from this network.

The **Network A+B Link** can be enabled or disabled depending on the network infrastructure. If enabled, both networks will share a common PTP clock.



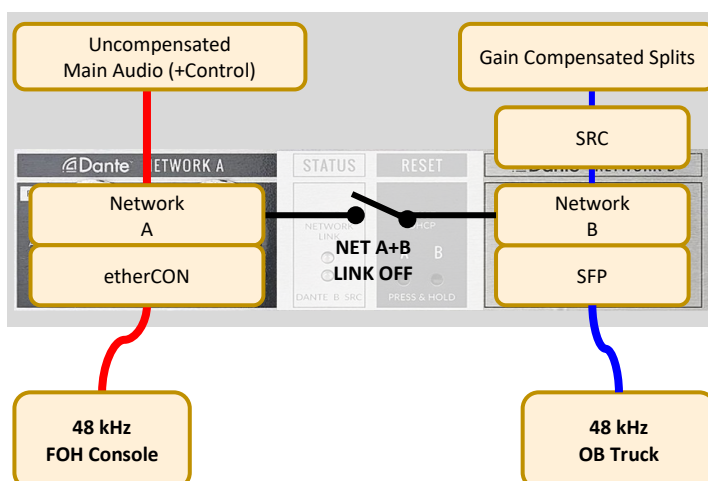
Sharing Signals Between Networks in Separate Clock Domains

For situations where two independent networks require access to the same stagebox inputs but have separate clock sources, for example an event with a FOH network and separate OB truck.

Network A is set to 48 kHz. The FOH console subscribes to the main audio channels and has ownership of the mic preamps.

Network B is set to 48 kHz and **Network B SRC** is enabled. The OB truck subscribes to the gain compensated split outputs available from this network.

The **Network A+B Link** will be disabled, with the additional benefit that stagebox control is unreachable from Network B.



Operation at Different Sample Rates

All analogue and AES inputs are available simultaneously for an SB 16.12 running at any available sample rate, or an SB 32.24 running at 44.1 or 48 kHz.

An SB 32.24 running at 88.2 or 96 kHz has a maximum of 32 inputs available. The last 8 inputs can either be analogue or AES. This is user-definable on a pair by pair basis directly from System T or Live console software, or using Network I/O Controller as shown in the [AES I/O](#) section of this guide.

	Dante Tx Channel Number 44.1/48 kHz	Dante Tx Channel Number 88.2/96 kHz
Analogue in 1-24	1-24	
Analogue in 25-32	25-32	25-32 (analogue/AES depending on switch in software)
AES in 1-8	33-40	

SSL Network I/O Controller

Installing Network I/O Controller

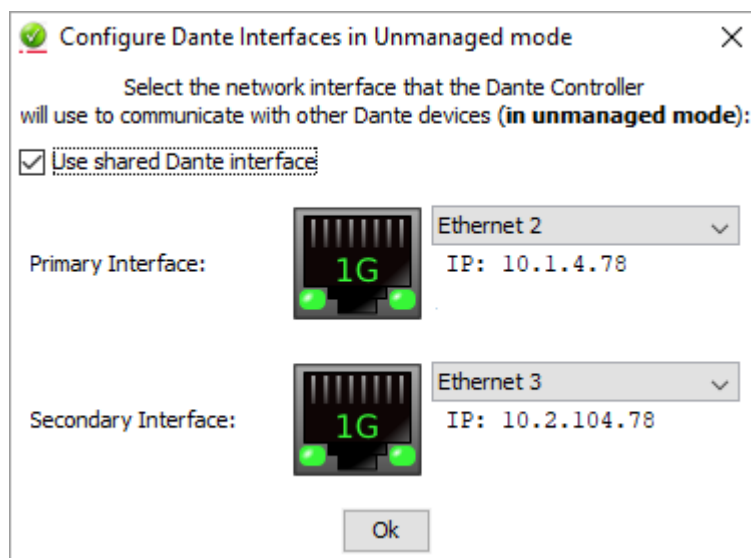
When SSL Network I/O is used without an SSL console, configuration and control is achieved using the SSL Network I/O Controller PC application. This can be downloaded from the [SSL website](#) as part of the Network I/O Stagebox upgrade package or as a standalone installer.

Locate and run the Network I/O Controller installer and follow the on-screen prompts to install the application.

Application data is stored per Windows user account, allowing each user's configuration of device filtering, sorting and application window size to be retained.

Network Configuration - PC

Once Network I/O Controller is installed, connect the Windows PC to the same subnet as the Network I/O. The SSL Network I/O Controller application uses the network adapters configured in Dante Controller for communication. Before starting Network I/O Controller first open Dante Controller and select the network adaptors connected to the Dante network. 'Use shared Dante interface' must be selected to ensure all applications using the Dante network use the correct adaptors. Subsequent changes to network settings may require Network I/O Controller to be restarted.

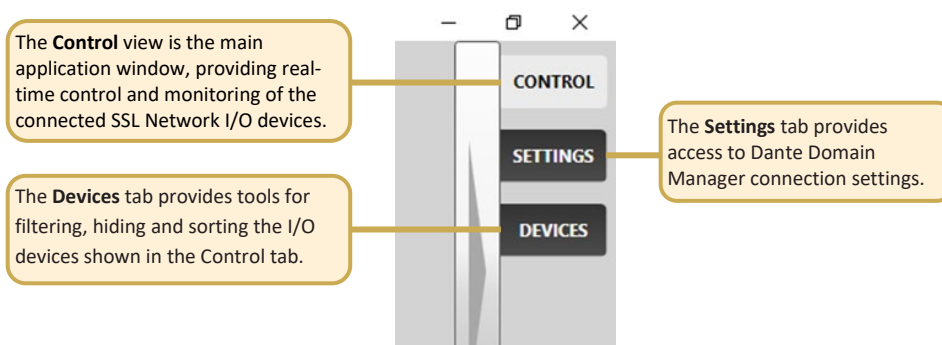


TCP/IP is used to communicate with the unit, so check Windows firewall settings if communications are not working.

Set the computer to 'Never Sleep' to maintain communication.

Application Navigation

Network I/O Controller is divided between three tabs: **Control**, **Settings** and **Devices**. These are accessed from the right hand side of the application.



The application can be resized horizontally and vertically to fit the display as desired. Click and drag from the side or corner of the application to resize. With the **Control** tab visible, increasing the window width allows more devices and input metering in the **Network View**, plus displays more channels for control in the **Detail View**. Increasing the window height provides larger metering in **Network View** and a longer fader for each input in the **Detail View**.

When set to full screen on a 1920x1080 display 16 channels are displayed in the **Detail View**.

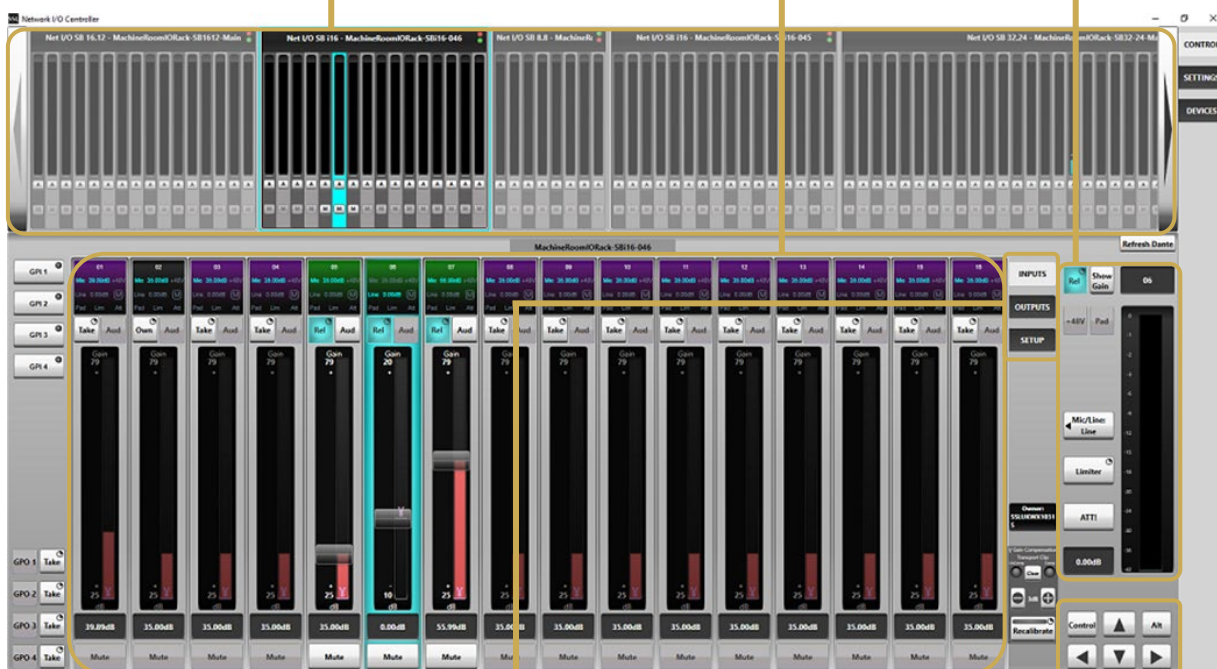
Control View

The **Control** tab is divided into five sections:

Network View shows each SSL device on the Dante network. Input meters are shown for every analogue input. Selecting a device brings its parameters into the **Detail View**. Selecting an input brings the input into the **Focus View**. Large arrows on the far left and right scroll for more devices.

Detail View shows channel details for the selected device. Left/right navigation controls scroll for more channels.

Focus View shows an expanded view of the selected channel.



Page Select selects the Detail View to show inputs, outputs, or setup options for each device.

Navigation switches the in-focus channel and allows for gain adjustment. These arrows are also mapped to the PC keyboard. **Control** toggles fine (0.1 dB) gain adjustment and **Alt** coarse (3 dB) gain adjustment.

Network View

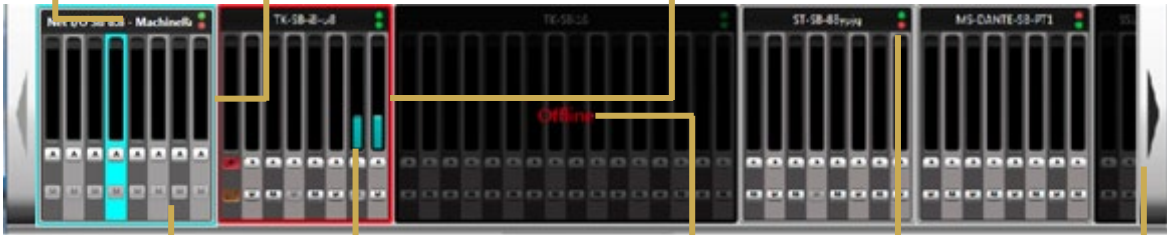
Device Name is set within Dante Controller.

Selected device is highlighted with a cyan outline. Devices and channels can be selected from here or with the scroll arrows.

A **Red Highlight** indicates a device that requires operator action:

- A flashing red background indicates a device with a clipping audio channel
- A solid red border highlights a device with an active Attention flag

If the device requiring attention is not already visible in the Network View window, then the appropriate large scroll arrow will show red to direct you to the appropriate device.



Att and Mute tallies show the status of these functions for every stagebox channel.

The **Level Meter** shows the real-time signal level for all analogue input channels. A red clipping indicator is also provided.

Greyed out devices marked **Offline** are 'known' to the network but unreachable, typically switched off.

PSU Tallies show the status of PSUs 1 and 2 for each stagebox.

Scroll arrows are used to navigate between devices. A black arrow indicates further devices are available.

Inputs/Outputs

Select the **Inputs**, **Outputs** or **AES I/O** tab in the Page Select area to view I/O available on the network.

Inputs

Control Status shows whether the viewer has control of the input's parameters. Each individual channel has independent ownership.

Rel in cyan indicates that this input is under the control of the viewer. Press and hold to relinquish control.

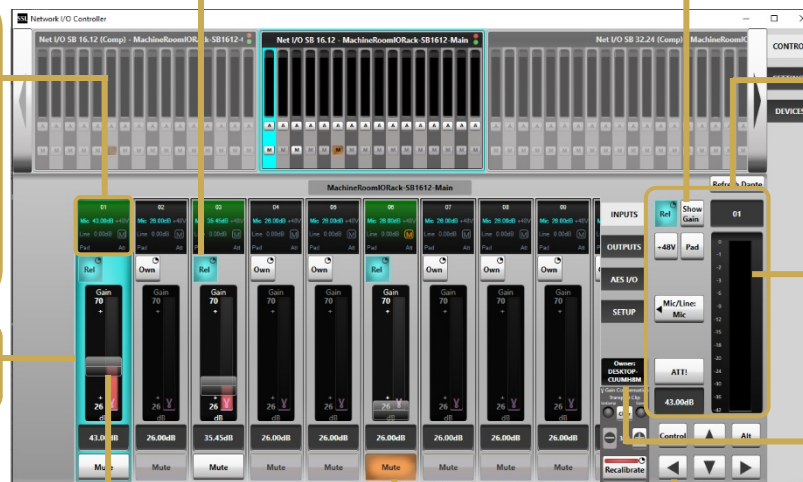
Take indicates that this input is NOT under the control of the viewer. Press and hold to take control from the owner.

Own indicates that this input is not owned by any controller. Press and hold to take ownership of this input.

Show Gain toggles the fader into the Focus Window. Gain can be controlled via mouse, keyboard, or numeric entry.

Channel Info shows all parameters of the channel at a glance. The background colour indicates ownership status: green for owned inputs, purple for inputs owned by another controller and black for unowned inputs.

Selected Channel is highlighted in cyan.



Focus Window displays the available parameters for the selected channel.

Level Meter shows the signal level for the selected channel. A red clipping indicator is also provided.

Ownership window displays the owner of the selected channel.

Fader allows for manual level control via the slider, keyboard arrow keys, or numeric entry by clicking the text Gain Value box.

Fader Level Bar is coloured red on microphone input channels and cyan on line level inputs.

Mute mutes the input or output channel. The mute state is stored in volatile memory on the unit and all channels will reset to unmuted if the unit is repowered.

Left and Right arrows switch the selected channel. **Up and Down** arrows adjust the gain for the selected channel in discrete 1dB steps. **Control** toggles fine (0.1 dB) gain adjustment and **Alt** coarse (3 dB) gain adjustment. These controls are mapped to the computer keyboard.

Focus Window

+48V toggles the mic preamp phantom power.

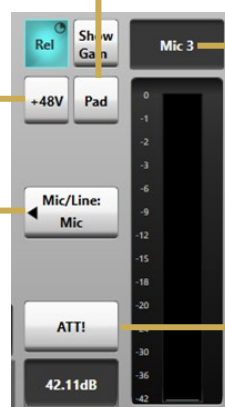
Selecting **Line** input will turn off phantom power.

Mic/Line toggles the appropriate input gain range and impedance for mic or line level sources.

Mic inputs have a gain range of 74 dB including the pad. The available range values are dependent on the operating level.

Line level inputs have a gain range of 34 dB. The available range values are dependent on the operating level.

Pad toggles the -30 dB mic preamp pad.



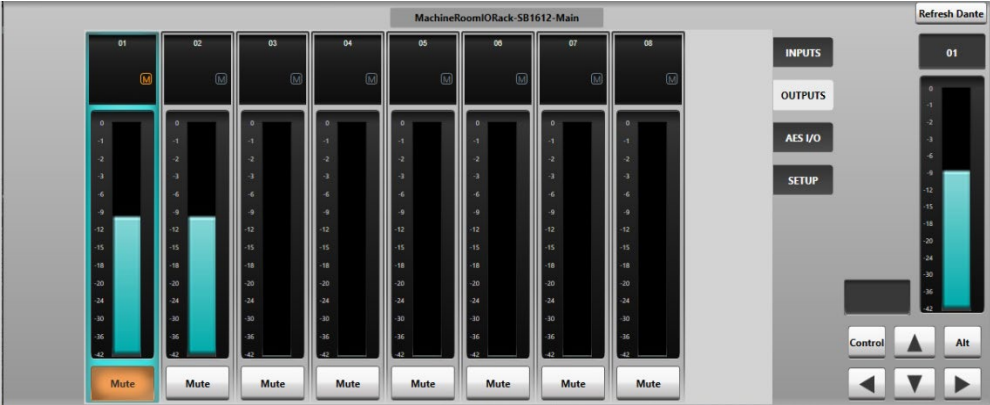
Channel Label as entered in Dante Controller.

ATT! (Attention) toggles the hardware front panel LED for swift identification of inputs or outputs.

Multiple channels can have Attention active.

Attention can be cancelled by pressing the **ATT!** button again on the selected channel.

Outputs



Mute allows individual outputs to be muted.

AES I/O

Control Status shows whether the viewer has control of the input’s parameters. Each individual channel has independent ownership.

Rel in cyan indicates that this input is under the control of the viewer. Press and hold to relinquish control.

Take indicates that this input is NOT under the control of the viewer. Press and hold to take control from the owner.

Own indicates that this input is not owned by any controller. Press and hold to take ownership of this input.

Focus Window displays the **AES Input Enabled** and **SRC In** parameters for the selected channel. **AES Input Enabled** is only applicable to the SB 32.24 and is detailed in the **Operation at Different Sample Rates** section of this guide.

Channel Info shows at a glance whether AES inputs (SB 32.24 only) and SRCs are enabled.

Selected Channel is highlighted in cyan.



Level Meter shows the signal level for the selected channels. A red clipping indicator is also provided.

Ownership window displays the owner of the selected channel.

Mute mutes the individual input or output. The mute state is stored in volatile memory on the unit and all channels will reset to unmuted if the unit is repowered.

Setup

Press **Setup** in the **Page Select** area to display the system configuration information.

Stagebox Ownership and **Inputs Ownership** settings are detailed under [Ownership](#).

Name shows the device name as set in Dante Controller.

Info shows the status of the device's redundant power supplies and fans. Red indicates a fault.

Operating Level allows selection of the maximum analogue I/O level in dBu (at 0 dBFS) for the device.

Clear Attention clears all active attention LEDs on the currently selected device.

SRC In enables the Sample Rate Converter on Dante Network B.

Reset IO Settings performs a device reset of SSL parameters, clearing ownership states and input settings.

Recalibrate All Owned Inputs resets the trim applied to the gain compensated inputs.

The screenshot shows the following interface elements:

- MachineRoomIORack-SB32-24-Main** (Title)
- SETUP** (Tab)
- Name:** MachineRoomIORack-SB32-24-Main
- Info:** PSU 1 ON, PSU 2 OFF, FAN 1 ON, 3200 RPM, FAN 2 ON, 3200 RPM, Primary Network Status: 10.30.3.199, Secondary Network Status: 10.31.1.88, Dante Module 1 fitted, Dante Module 2 fitted, Sample Rate: 48 kHz
- Ownership:** Owner: DESKTOP-CUUMH8M, Stagebox Ownership (selected), Inputs Ownership
- Attention:** Clear Attention, Net B SRC, SRC In
- OPERATING LEVEL:** 24 dBu
- GAIN COMPENSATION:** Recalibrate All Owned Inputs, Warning: May cause jump in audio on compensated outputs
- RESET SETTINGS:** Reset IO Settings
- INPUTS:** Take, Show Gain, 16
- OUTPUTS:** +48V, Pad
- AES I/O:** SETUP, Mic/Line: Mic
- Owner:** SSLIUKW4101A
- ATT!** (ATTENTION)
- 26.00dB** (Gain Compensation)
- Control:** Up, Down, Left, Right, Alt

Settings View

For installations using Dante Domain Manager (DDM), the **Settings** tab provides access to DDM connection settings. Network I/O Controller can connect as a control client in the same way that Dante Controller, SSL Live and System T consoles can. Consult the Dante Domain Manager User Guide for further information regarding DDM.

DDM Server Connection Status displays whether there is an active connection to DDM.

DDM Server allows entry of the server name or IP address.

User Name and Password credentials for DDM are stored within Network I/O Controller. Once entered, Network I/O Controller will automatically attempt connection.

Selected Domain shows the active domain and provides a list of all Dante domains the selected user has access to.

The screenshot shows the following interface elements:

- DANTE DOMAIN MANAGER** (Title)
- DDM Server Name/IP Address:** 10.40.0.30
- DDM Server Port:** 8443
- User Name:** admin
- Password:** (masked with dots)
- DDM Server Connection Status:** Connected (green dot)
- Selected Domain:** PDA-SystemT
- Current Domain:** PDA-SystemT
- Attempt Reconnection** (button)

Devices View

The **Devices** tab provides management of the I/O devices displayed in the **Control View**.

Device Filtering allows Network I/O device types to be hidden, both from the **Control View** and the **Control View Filtering and Sorting** section. An example use case may be to hide all compensated devices so that the **Control View** only shows the gain tracked signals, not the compensated split feeds.

Control View Filtering and Sorting provides control of the order in which devices are displayed in the **Network View** of the **Control View**, in addition to individual device filtering.

SHOW ALL clears the currently selected device filters.

HIDE OFFLINE ensures only currently connected devices are displayed, irrespective of device type.

Device Filtering is provided for all Network I/O device types available in Network I/O Controller. These device types can be pre hidden, so they are not visible from this instance of the software when they are discovered. Device filtering hides the selected device types from the **Control View** and the below **Control View Filtering and Sorting** table.

SHOW ALL

HIDE SB8.8

HIDE SB16

HIDE SB16.12

HIDE SB32.24

HIDE A16.D16

HIDE A32

HIDE D64

HIDE OFFLINE

HIDE SB8.8 (Comp)

HIDE SB16 (Comp)

HIDE SB16.12 (Comp)

HIDE SB32.24 (Comp)

CONTROL

SETTINGS

DEVICES

Control View Filtering and Sorting

Name	Device Type	Description	Index	IP Address	Is Online	Hidden
MachineRoomIORack-SB1612-Comp	SB 16.12 (Comp)	SB 16.12 B	3	10.30.0.159		☐
MachineRoomIORack-SB1612-Main	SB 16.12	SB 16.12	2	10.30.0.158		☐
MachineRoomIORack-SB32-24-Comp	SB 32.24 (Comp)	SB 32.24 B	11	10.30.3.197		☐
MachineRoomIORack-SB32-24-Main	SB 32.24	SB 32.24	6	10.30.3.199		☐
MachineRoomIORack-SB18o8-088	SB 8.8	8 I/O Dante Stage Box	12	10.30.3.213		☒
MachineRoomIORack-SB18o8-088	SB 8.8 (Comp)	8 I/O Dante Stage Box (Compensated)	13	10.30.3.213		☒
MachineRoomIORack-SB18o8-090	SB 8.8	8 I/O Dante Stage Box	7	10.30.3.195		☐
MachineRoomIORack-SB18o8-090	SB 8.8 (Comp)	8 I/O Dante Stage Box (Compensated)	8	10.30.3.195		☒

Column headings can be selected to affect the **Sort Order** of this table and importantly the order in which devices are displayed in the **Network View** of the **Control** tab.

Selecting the heading for a column will set it as the ordering field and toggle between ascending or descending. Sorting can be alpha-numeric by **Name** or **Device Type**, or numerically by **IP address** or **Index** (discovered order).

Individual devices can be **Hidden** from the **Control View**.

Ownership

Net I/O stageboxes can be controlled by SSL Live or System T consoles and the Network I/O Controller PC application. Separate **Stagebox** and **Input** ownership options are available to prevent control conflicts between networked consoles and control computers sharing resources.

The screenshot shows the control interface for the MachineRoomIO Rack SB32-24-Main. The interface is divided into several sections: SETUP, OPERATING LEVEL, INPUTS, OUTPUTS, AES I/O, and SETUP. The SETUP section includes fields for Name, Info, Temperature, Ownership, and Attention. The OPERATING LEVEL section shows a 24 dBu level. The INPUTS section shows a list of inputs with their status (ON/OFF) and RPM. The OUTPUTS section shows a list of outputs with their status (ON/OFF) and RPM. The AES I/O section shows a list of AES inputs with their status (ON/OFF) and RPM. The SETUP section includes buttons for Clear Attention, Stagebox Ownership, and Inputs Ownership. The Ownership section shows the current owner (LIVE-AE7B) and buttons for Stagebox Ownership and Inputs Ownership. The Attention section shows a Clear Attention button. The OPERATING LEVEL section shows a 24 dBu level. The INPUTS section shows a list of inputs with their status (ON/OFF) and RPM. The OUTPUTS section shows a list of outputs with their status (ON/OFF) and RPM. The AES I/O section shows a list of AES inputs with their status (ON/OFF) and RPM. The SETUP section includes buttons for Clear Attention, Stagebox Ownership, and Inputs Ownership. The Ownership section shows the current owner (LIVE-AE7B) and buttons for Stagebox Ownership and Inputs Ownership. The Attention section shows a Clear Attention button.

Press and hold **Inputs Ownership** to open the Ownership menu:

- Own All** will assign all unowned inputs
- Take All** will assign all inputs including those owned by another controller
- Release All** will release ownership of inputs owned by the controller

The current owner is listed in white.

Press and hold **Stagebox Ownership** to assign or relinquish stagebox ownership.

Stagebox Ownership

Stagebox ownership provides general ownership of the stagebox configuration, covering the following parameters:

- Operating level
- AES or analogue input selection (SB 32.24 only)
- SRC state of AES inputs
- SRC state of Network B

A stagebox does not require an owner at all times, so can remain unowned if the above settings do not need to be adjusted.

Input Ownership

Input ownership offers a level of protection to inputs: when an input is owned the input parameters can only be modified by the device that owns it. Parameters covered by input ownership are:

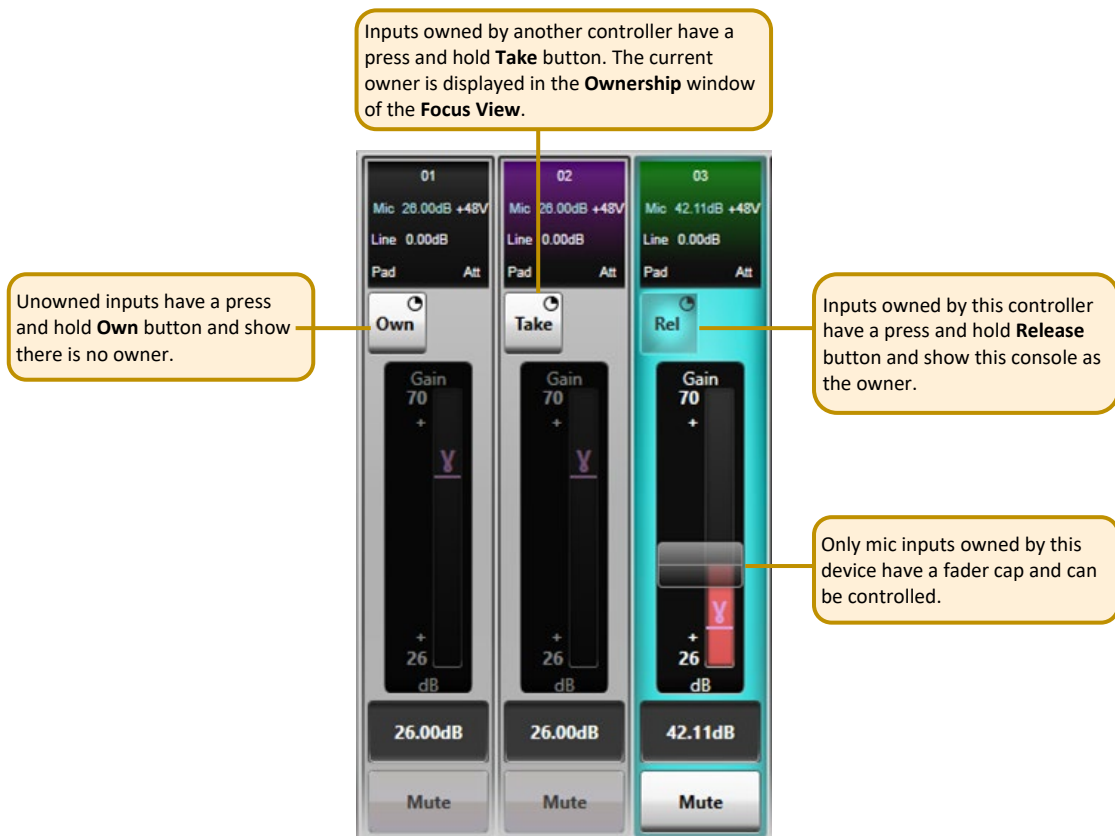
- Mic gain
- Phantom power
- Mic/line switching
- Pad
- Input mute
- Compensated output recalibration

Note that multiple consoles can share the same input signal but only one device can control the input parameters. Altering the input settings will affect all consoles using the input.

N.B. Ownership settings are stored on the SB 32.24 and SB 16.12. The mute state is stored in volatile memory on the unit and all channels will reset to unmuted if the unit is repowered.

Individual Input Ownership

One of three options will be displayed when an input is selected on a device, depending on the current ownership state. These options are **Own**, **Take** and **Release**:



Console Routing and Input Ownership

When an SSL console makes routes from a stagebox mic input to a console channel, the console will automatically become the owner of any unowned inputs. If an input is owned by a different controller then routing will not automatically take ownership, **Take** ownership will need to be performed if input control is required on this device. Note that the audio route will still be made regardless of whether ownership is assigned.

When an SSL console unloads a showfile (as happens when a new showfile is loaded or the console is powered down), routes are unmade. Unmaking routes for mic inputs automatically releases ownership, leaving them unowned for the next use. Ownership status is stored on the device, for all controllers on the distributed network to take account of.

If a stagebox is unreachable (e.g. it has been powered off) when the console showfile is unloaded then the stagebox storage of ownership will persist. If the stagebox is to be used on the same console (or set of consoles with the same showfiles) on next use, this persistence of ownership will not matter. If the stagebox is to be used on a different console, ownership will need to be cleared using **Reset I/O Settings** from console software or Net I/O Controller, or the hardware reset option detailed in [Status and Reset](#).

Ownership from Network I/O Controller is manually controlled. Network I/O Controller does not manage Dante routing, this is done with Dante Controller.

Gain Compensation

Each stagebox mic/line input has two transmit channels that can be subscribed to from the Dante network. **Main** channels follow the mic gain as set by the controller. **Compensated** channels nullify mic gain changes by applying a digital trim offset which is the opposite of any analogue gain changes. Using **Compensated** channels ensures that devices receiving signals from the same stagebox avoid undesired changes to input source levels.

Compensated Ports

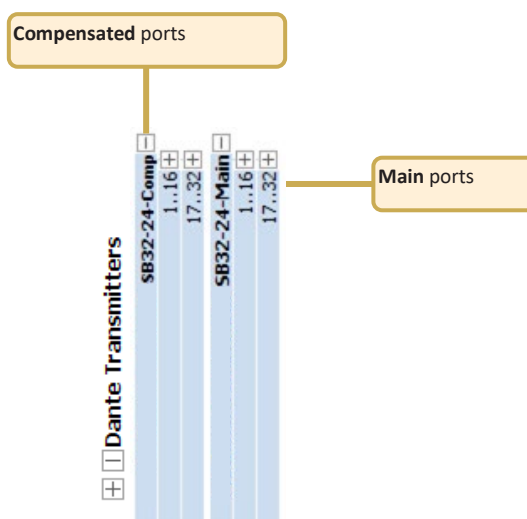
When connected to an SSL console or the Network I/O Controller app the main and compensated channels show as two separate devices. The visibility of main and compensated channels for an SB 32.24 or SB 16.12 will depend on the network A and B link state, as detailed in [Dante Connection Examples](#).



The compensated output's level is controlled in the stagebox itself, so any Dante device can receive the compensated signal, it does not have to be an SSL console.

If networks A and B are linked then the compensated channels can be found as separate devices in Dante Controller, under the Transmit tab of the Routing Matrix or Device View.

If networks A and B are unlinked then either the main **or** compensated ports will be shown, dependant on which is connected.



Calibration Point

The **Calibration** point is the value at which the analogue gain equals a digital trim value of 0 dB, i.e. there is no digital trim applied. Digital trim will be applied when the analogue gain level is above or below the **Calibration** point.

Clear removes the clip indicator.

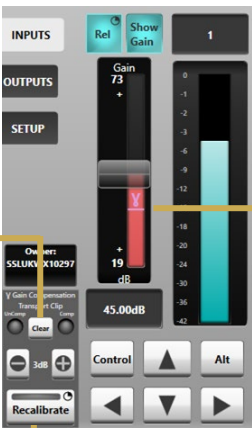
Pressing the ± 3 dB buttons adjusts the **Calibration** point by ± 3 dB.

The **Calibration** point is indicated on the fader level bar as **y**.

Press and hold **Recalibrate** to:

Recalibrate the compensated gain value to match the current analogue gain value when in **Line** mode (removing any digital trim).

Recalibrate the compensated gain value to 10 dB under the current analogue gain value when in **Mic** mode. This feature has been designed to protect the compensated signal against digital clipping in the event that the analogue gain control is drastically reduced.



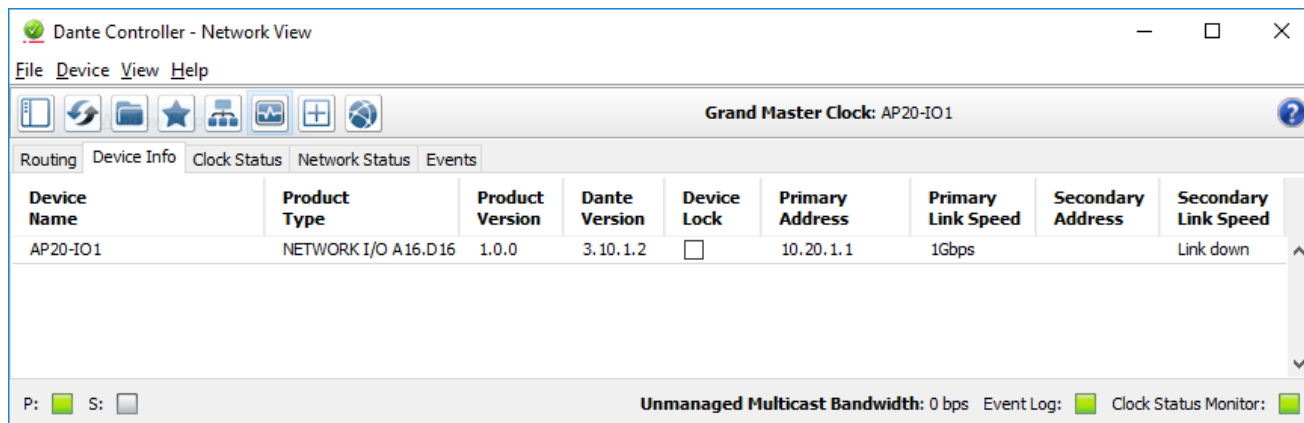
Recalibrate Indication

The **Recalibrate** colour bar will light **green** if recalibration would decrease the level of the compensated signal.

The **Recalibrate** colour bar will light **red** as a warning that recalibration would increase the level of the compensated signal.



Dante Controller



Refer to Audinate’s Dante Controller user guide for complete information on Dante Controller software. The information below details the basics required to get started.

Clock sync, device naming, AES67 configuration and network management are all done within Dante Controller.

Dante utilises the device name for routing. Each device must have a unique name – if a name is duplicated it will be appended with a number.

Network Config

Each device requires its own unique IP address. This may be automatically configured, provided by a DHCP server or assigned manually. Unless shipped as part of a preconfigured system, Network I/O units are set to obtain an IP address automatically.

If the IP settings need to be changed to a fixed address – to match the network environment in which the unit is to be installed – this can be achieved using the Dante Controller application.

Remember that the computer’s network adapter configuration will also need to be updated to match the Network I/O.

The primary and secondary ports must not be connected to the same logical network. Ideally, separate switching hardware should be provided for primary and secondary networks. Creating VLANs on shared hardware is acceptable but does not provide the most robust redundancy.

Device Info

The **Device Info** tab shows an overview of all devices on the Dante network including name, product type, software version, IP address, link speed and status.

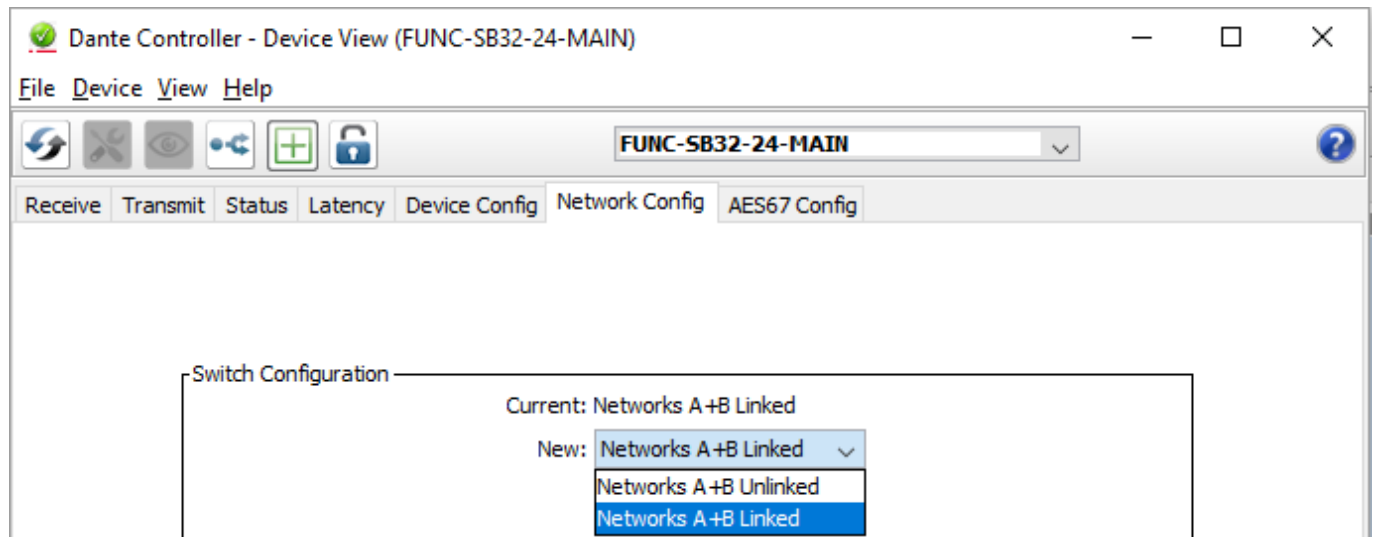
Device > Device View provides configuration and diagnostics for each device including Tx and Rx subscription and signal status, software and firmware version information, network utilisation and real-time latency measurement, as well as configuration of device name, sample rate, bit depth, latency, IP address and AES67 parameters. The **Network Config** tab provides IP address configuration options.

The device will resolve to a link-local address if it is set to obtain an IP address automatically and no DHCP server is present. To access via link-local, set your computer to obtain an IP address automatically, directly connect to the device’s primary port and wait for the link-local addresses to resolve. Link-local addresses for the Primary Dante interfaces obtain IP addresses in the 169.254.xxx.xxx range, secondary Dante interfaces obtain addresses in the 172.31.xxx.xxx range.

Linking/Unlinking Networks A and B

The SB 32.24 and SB 16.12 can be configured to have both the gain-dependant and gain-compensated audio available on the same network, or to have them assigned to two separate (A/B) networks. Dante Controller is used to link/unlink the A/B networks.

Open the **Device View** window from the **Device** menu, or double-click the device name within any of the tabs in the main Dante Controller window. Click on the main (**not** compensated) device's name and select the **Network Config** tab. From the Switch Configuration drop-down select **Network A+B Linked** or **Network A+B Unlinked**. If the networks are unlinked only the gain-compensated splits will be available from network B and only the gain-dependant audio from network A. If the networks are linked, both gain-compensated and gain dependant splits are available from both network A and B connectors.



N.B. If the unit is being used in **Network A+B Linked** mode both devices (main and compensated) must have their IP addresses in the same subnets as each other. Note that both primaries must be in the same subnet, which is a different subnet to that used for both secondaries. If this is not correctly configured a warning will be shown in Dante Controller.

Appendices

Appendix A – General Specifications

Parameter	SB 32.24	SB 16.12	Notes
Depth	456 mm (18") 494 mm (19.5")	456 mm (18") 494 mm (19.5")	(excluding handles) (incl. handles)
Height	220 mm (8.7")	133 mm (5.2")	5 RU / 3 RU
Width	431 mm (17") 483 mm (19")	431 mm (17") 483 mm (19")	Unit width ex. rack ears Including rack ears N.B. Rack ears not removable
Weight	14 kg	10.8 kg	
Boxed Size	620 x 620 x 400 mm (24.4 x 24.4 x 15.7")	620 x 620 x 290 mm (24.4 x 24.4 x 11.4")	
Boxed Weight	16 kg	13 kg	
Power	100-240 V 3.0 – 1.5 A 170 W max.	100-240 V 3.0 – 1.5 A <170 W	
Acoustic Noise	NR 25	NR 23	Measured 1m from the front of the unit at the lowest fan speed. This speed will be active when the unit is within operating temperature limits.
Operating Temperature	+5°C to 40°C	+5°C to 40°C	
Storage Temperature	-20°C to 50°C	-20°C to 50°C	

Ventilation

Ventilation is from the rear of the unit.

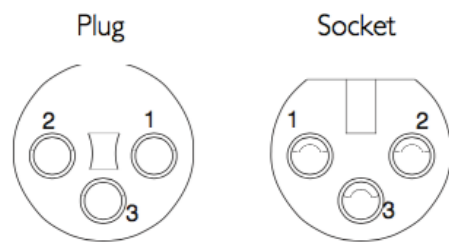
Appendix B - Connector Pin Outs

XLR Wiring

Connector Dimensions: 19 x 60 mm (approx.)
Cable Diameter: 8-12 mm (typical)

Pinout for balanced audio:

Pin 1 Screen/Ground
Pin 2 Hot (+ve)
Pin 3 Cold (-ve)



Connectors Viewed From Wiring Side

Appendix C – Performance Specifications

<i>Mic/Line Inputs</i>		
Parameter	Value	Notes
Gain Range	+26 to +70 dB -4 to +30 dB -4 to +40 dB	Mic mode, 0 dBFS, 0.1 dB gain step size Line mode, 0 dBFS, 0.1 dB gain step size Mic mode with pad engaged
Maximum Input Level	+27.5 dBu	30 dB Pad inserted
Frequency Response	± 0.2 dB	Mic mode, 20 Hz – 20 kHz (@48kHz) Typically ± 0.1 dB
Equivalent Input Noise	< -123 dB	Mic mode, 70 dB gain, A-weighted filter, 22 kHz bandwidth. Typically -124 dB
Usable Dynamic Range	> 115 dB	Mic mode, 0 dBFS, A-weighted filter, 22 kHz bandwidth. Typically 116 dB.
Input Impedance	2.3 kΩ / 10 kΩ	Mic / Line. Selectable per channel
CMRR	> 70 dB > 90 dB	Mic mode, 20 Hz – 20 kHz, 0 dBu Mic mode, 1 kHz, 0 dBu
Crosstalk	< -75 dB < -90 dB	20 Hz – 20 kHz 1 kHz
THD+N	< 0.01 %	Mic mode, 20 Hz – 20 kHz, -1 dBFS, 22 kHz bandwidth.
Phantom Power (Mic Input)	+48 V ±4 V 10 mA	Selectable per channel
Pad (Mic Input)	30 dB	Selectable per channel
Operating Levels	+24, +22, +20, +18, +15 dBu	
Sample Rates	44.1, 48, 88.2 or 96 kHz	
Resolution	24 bit	
Group Delay	19 samples	Analogue to Dante module

Measurement Parameters

Sample Rate:	96 kHz
Operating Level:	+24 dBu = 0 dBFS
Mic input termination:	150 Ω
Mic Mode Gain:	26 dB (unless stated otherwise)
Reference frequency:	1 kHz (unless stated otherwise)

<i>Line Outputs</i>		
Parameter	Value	Notes
Maximum Output Level	+24 dBu	600 Ω / 10 k Ω load
Output Impedance	< 50 Ω	
Frequency Response	$\pm$ 0.3 dB	-1 dBFS, 20 Hz – 20 kHz
Usable Dynamic Range	> 116 dB	0 dBFS, A-weighted filter, 22 kHz bandwidth Typically >117 dB.
Crosstalk	< -90 dB < -105 dB	20 Hz – 20 kHz, 0 dBFS 1 kHz, 0 dBFS
THD+N	< 0.01 %	20 Hz – 20 kHz, -1 dBFS. 22 kHz bandwidth Typically < 0.004 %
Output Symmetry	> 40 dB	20 Hz – 20 kHz Typically > 50 dB
Sample Rates	44.1, 48, 88.2 or 96 kHz	
Resolution	24 bit	
Group Delay	11 samples	Dante module to analogue

Measurement Parameters

Sample Rate: 96 kHz
 Operating Level: +24 dBu = 0 dBFS
 Reference frequency: 1 kHz (unless stated otherwise)

<i>Digital Inputs</i>		
Parameter	Value	Notes
Input Impedance	110 Ω	Transformer coupled
Sample Rates	44.1, 48, 88.2 or 96 kHz	32 kHz - 216 kHz with sample rate converters enabled
Sample Rate converters	Yes	Selectable per AES channel pair
Resolution	24 bit	

<i>Digital Outputs</i>		
Parameter	Value	Notes
Output Impedance	110 Ω	Transformer coupled
Sample Rates	44.1, 48, 88.2 or 96 kHz	
Resolution	24 bit	

Appendix D – Safety Notices

General Safety

1. Please read and keep this document.
2. Adhere to all warnings and follow instructions.
3. This electrical equipment should not be used near water.
4. Cleaning should only be with dry cloths or products compatible with electrical devices – never when the unit is powered.
5. Keep the unit free of dust and use in a clean environment.
6. Do not use near any heat source or in direct sunlight.
7. Do not use near naked flames.
8. Do not place heavy objects on the unit.
9. Only use attachments/accessories recommended by the manufacturer.
10. Unplug the device during lightning storms or long periods of non-use.
11. The unit can only be serviced by qualified personnel – Seek immediate service if:
 - I. The unit has been exposed to moisture
 - II. The unit has been dropped
 - III. The unit does not operate normally
12. Do NOT modify this unit – alterations may affect performance, safety and/or international compliance standards.
13. SSL does not accept liability for damage caused by maintenance, repair or modification by unauthorised personnel.

Installation Notes

1. When installing this apparatus either fix it into a standard 19" rack or place the apparatus on a secure level surface.
2. When this apparatus is rack mounted, fit all rack screws. Rack shelves are recommended for this apparatus.
3. Allow a 1U gap above and below this apparatus for cooling.
4. Do not obstruct any ventilation cut-outs or exhaust fans.
5. Ensure that no strain is placed on any cables connected to this apparatus. Ensure that all such cables are not placed where they can be stepped on, pulled or tripped over.

Power Safety

1. The unit is not supplied with a mains lead allowing you to use IEC distribution of mains cables of your choice. Any mains cable used must fulfil the following:
 - I. Refer to the ratings label on the rear of the unit and always use suitable mains cords.
 - II. The unit should ALWAYS be earthed with the earth on both the IEC sockets (when both are used).
 - III. Please use - compliant 60320 C13 TYPE SOCKET. When connecting to supply outlets ensure that appropriate sized conductors and plugs are used to suit local electrical requirements.
 - IV. Maximum cord length should be 4.5 m (15').
 - V. The cord should bear the approval mark of the country in which it is to be used.
2. The appliance coupler is used as the disconnect device, ensure that it is connected to an unobstructed wall outlet.
3. The mains inlets are designed for connection to a single phase AC supply however each inlet can safely be connected to a separate phase of a three phase mains supply.
Warning: if connected to separate phases up to 400 V potential phase to phase may be present.
4. The clear markings regarding redundant power supplies detailed on the unit must be transferred into the installation to ensure both power sources are removed before qualified personnel service the unit.

GB The apparatus shall be connected to mains socket outlets with a protective earthing connection

DEN Apparatets stikprop skal tilsluttes en stikkontakt med jord, som giver forbindelse til stikproppens jord

FIN Laite on liitettävä suojamaadoituskoskettimilla va rustettuumpistorasiaan

NOR Apparatet må tikoples jordet stikkontakt

SWE Apparaten skall anslutas till jordat uttag



ATTENTION! This equipment must be Earthed. Refer to manual for installation instructions.

CAUTION! Disconnect all power sources before removing any panel (s). No user-serviceable parts inside – to be serviced only by qualified personnel.



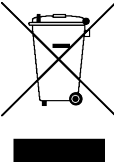
WARNING! Un-Earthed metal parts may be present inside enclosure. Check for hazardous voltages before touching.

For protection against risk of fire – replace only with same type / rating of fuse. Do not expose to rain or moisture.

For EU

The stagebox is CE compliant and fully conforms with the current protection requirements of the European community council directives on EMC and LVD. Note that any cables supplied with SSL equipment may be fitted with ferrite rings at each end. This is to comply with the current regulations and these ferrites should not be removed. Any modifications to this equipment may adversely affect the CE compliance of this product.

Environmental Declaration



The symbol shown here, which is on the product or its packaging, indicates that this product must not be disposed of with other waste. Instead, it is the user’s responsibility to dispose of their waste using a designated collection point for recycling of waste electrical and electronic equipment. The separate collection and recycling of your waste equipment at the time of disposal will help to conserve natural resources and ensure that it is recycled in a manner that protects human health and the environment. For more information about where you can dispose of your waste equipment for recycling, please contact your local city office, your household waste disposal service or where you purchased the product.

RoHS Notice

Solid State Logic has conformed and this product has conformed to European Union’s Directive 2011/65/EU on Restrictions of Hazardous Substances (RoHS) as well as the following sections of California law which refer to RoHS, namely sections 25214.10, 25214.10.2, and 58012, Health and Safety Code; Section 42475.2, Public Resources Code.

For USA

To the User:

- 1. Do not modify this unit! This product, when installed as indicated in the instructions contained in the installation manual, meets FCC requirements.
- 2. Important: This product satisfies FCC regulations when high quality shielded cables are used to connect with other equipment. Failure to use high quality shielded cables or to follow the installation instructions may cause magnetic interference with appliances such as radios and televisions and will void your FCC authorisation to use this product in the USA.
- 3. Note: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Electromagnetic Compatibility

EN55103-1:2009, EN55103-2:2009 Environments E1, E2, E3 and E4

Typical average initial in-rush current: 1.2 A. Typical peak in-rush current: 5.2 A.

The audio input/output and network ports are screened-cable ports and any connections to them should be made using braid-screened cable and metal connector shells in order to provide a low impedance connection between the cable screen and the stagebox. All network connections should be of Cat5e standard or above.

Environmental

Temperature	Operating: +5 to 40 °C	Storage: -20 to 50 °C
Vibration	Operating: < 0.2 G (5–200 Hz)	Non-operating: < 0.4 G (5–200 Hz)
Shock	Operating: < 3 G (11 ms max.)	Non-operating: < 10 G (11 ms max.)