

Network I/O – SB i.16 and SB 8.8

Routable Audio Network Stageboxes

User Guide

Stagebox. This is SSL.

Solid State Logic
SOUND | | VISION

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Document History

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Introduction

OVERVIEW

SB i.16 and SB 8.8 are, respectively, sixteen-input and eight-input/output SuperAnalogue™ stageboxes, with remote control software, for all high-quality AoIP applications.

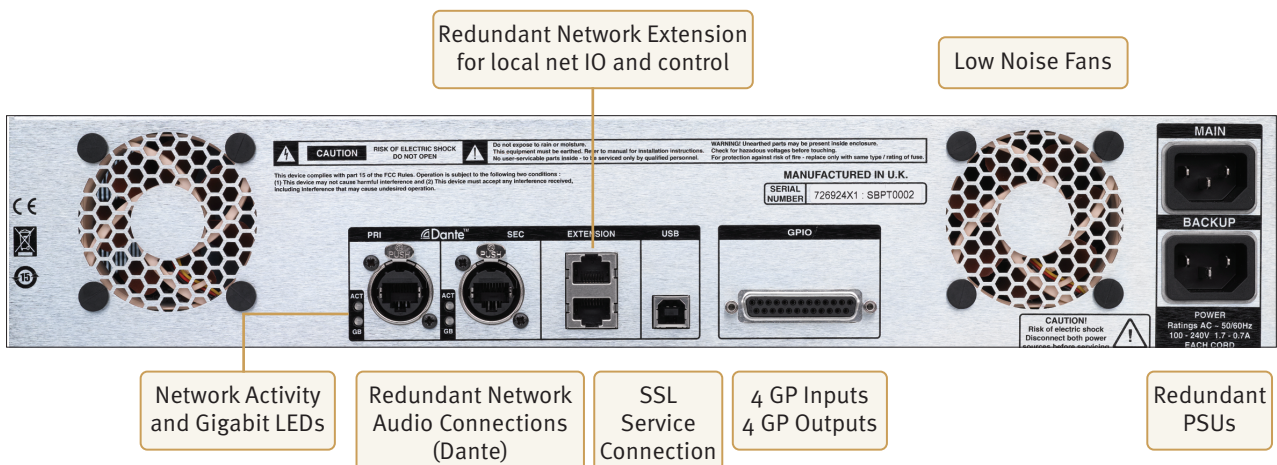


Redundant power, redundant ruggedized EtherCon Dante connection plus four GPIOs complete the professional hardware requirement.

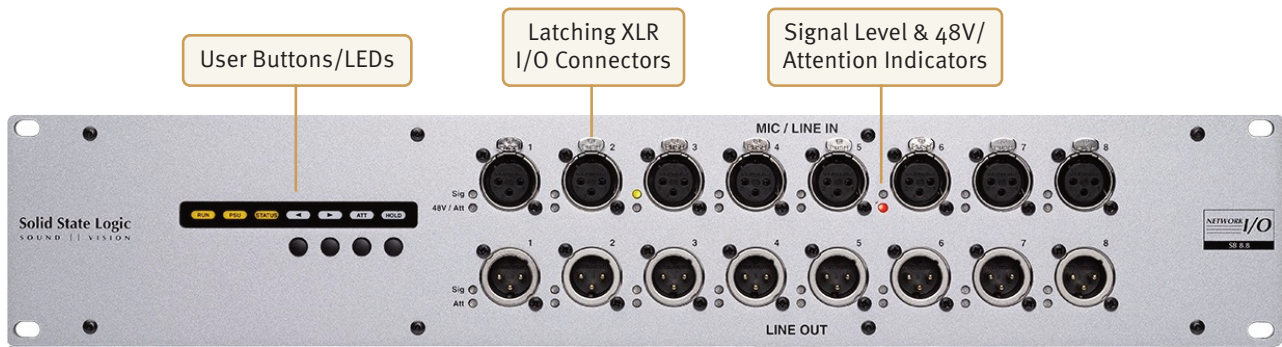
Whether you're mixing music festivals, integrating a fixed installation, need preamps in every corner of your broadcast studio or are simply looking for the ultimate mobile recording rig, SSL Network I/O devices will improve your sound quality and workflow.

Key Features

- Interface between studio/stage/recording-area and IP audio networks using Dante
- Redundant PSUs and Dante ports
- GPIO connectivity – embed tallies across the network
- Redundant network extension ports
- Clear front panel indication – signal present, phantom power, channel attention
- Front facing XLR connections
- AutoPad – automatically adjusts gain & pad settings to accommodate widest possible range of input signals
- Three-speed ball-bearing fan cooling – sufficiently quiet to place on a studio floor

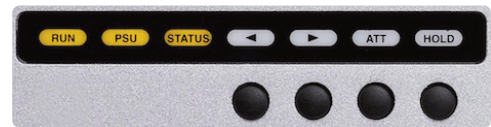


FRONT PANEL LAYOUT



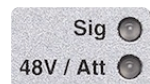
User Buttons

- **Run**, **PSU**, and **Status** LEDs are informational and are green in normal operation. A red **PSU** LED indicates a single power supply in operation; a red **Status** LED indicates a fault – refer to the **Setup** information window (see page 11 for details).
- ◀ ▶ Arrows are for channel selection. When using the arrow buttons, the Attention LED will flash red on the selected channel.
- **Att** (Attention) allows a user to 'push' attention (for the already selected channel) to the software control application for swift identification of inputs or outputs. *Easily and quickly identify channels of interest between the studio floor and the control room.*
 - Multiple channels can have Attention active
 - Pressing the **Att** button again on the selected channel will cancel the Attention signal
- **Hold** provides quick access to two system operations:
 - Press the **Hold** and ◀ button for three seconds to set the primary Dante IP address to DHCP. (This leaves the secondary Dante IP address at its previous setting.)
 - Press the **Hold** and **Att** buttons for three seconds to reset to factory settings



Channel LEDs

- Analogue signal LEDs (**Sig**) are green above -40 dBFS and red at -0.1 dBFS (clipping).
- **48V / Att** indicates phantom power, software selection, and/or attention depending on red, green, or flashing combinations:
 - **Red** – phantom power on
 - **Red flashing** – channel selected (see Arrows user buttons above)
 - **Green flashing** – channel Attention active
 - **Green & red flashing** – phantom power on & channel Attention active



Hardware Connectivity

POWER

Each Stagebox includes redundant PSUs with IEC connectors; either supply can individually power the unit. Ideally these should be connected to separate mains supplies to provide external connection redundancy.



DANTE

Primary and secondary – for a redundant network – EtherCon connectors accommodate ruggedized or standard Ethernet cable.

A pair of LEDs per port provide network information:

ACT flashes when there is network activity, **GB** shows gigabit network status.

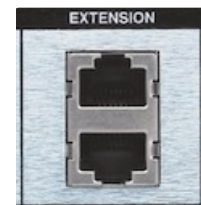


EXTENSION

These are switched ports of the primary and secondary Dante ports respectively. They allow direct connection of a control PC or even another Dante device.

In Dante Controller it is possible to set Dante ports to switched mode rather than redundant mode. While this is possible, there is no need to here as the extension ports provide this functionality, without loss of redundancy.

Never connect Primary and Secondary ports to the same single Dante network.



GPIO

4 General Purpose opto-coupled inputs and 4 General Purpose relay outputs allow embedding and de-embedding of logic signals across the network.

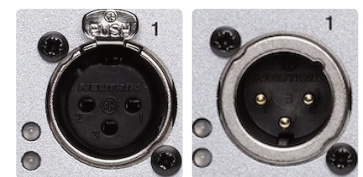
GPIO routing features will be available in a future software release.

See Appendix C, page 16 for pinout information.



AUDIO INPUTS AND OUTPUTS

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



USB

For service and diagnostic purposes.



Connecting a PC

NETWORK CONNECTION

Configuration and control of Stageboxes is carried out using the SSL **Network I/O – Controller** PC application. This program can be downloaded from SSL's website [here](#). (You will need to be logged in to your SSL account.)

- Download the application using the link above.
- Double-click the downloaded file to run the installer, then follow the on-screen instructions.

Once the application has installed:

- Connect the Windows PC to the same subnet as the stagebox. The SSL Network I/O – Controller application uses TCP/IP to communicate with the stagebox, so check your [firewall](#) settings!
- Alternatively, connect directly to one of the **Extension** ports using a standard Ethernet cable.

The Extension ports are switched ports of the Primary and Secondary Dante ports respectively – quite a handy addition!

You may need to [change your computer's TCP/IP settings](#) to match your Dante subnet.

Network configuration should be done before opening the application; subsequent changes to network settings may require 'Network I/O – Controller' to be restarted.

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

For additional information see *Dante Controller* section, page 12.

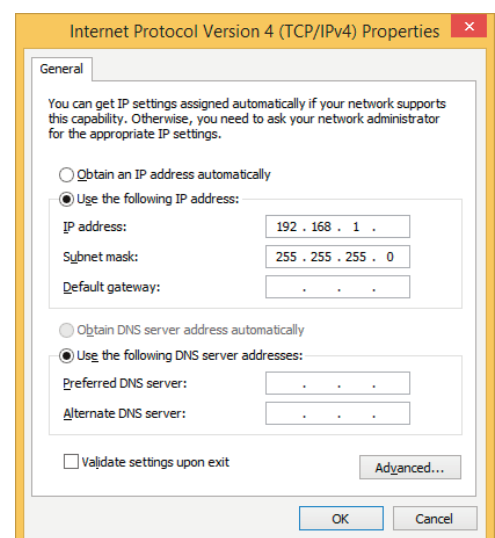
IP Address

Stagebox units are shipped with the IP address set to use DHCP.

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 your computer's TCP/IP network settings will also need to be updated to match those of the stagebox unit (using the Properties panel).

*Pressing the front panel **Hold** and ◀ buttons for three seconds will automatically reset the stagebox's Dante IP address to DHCP.*

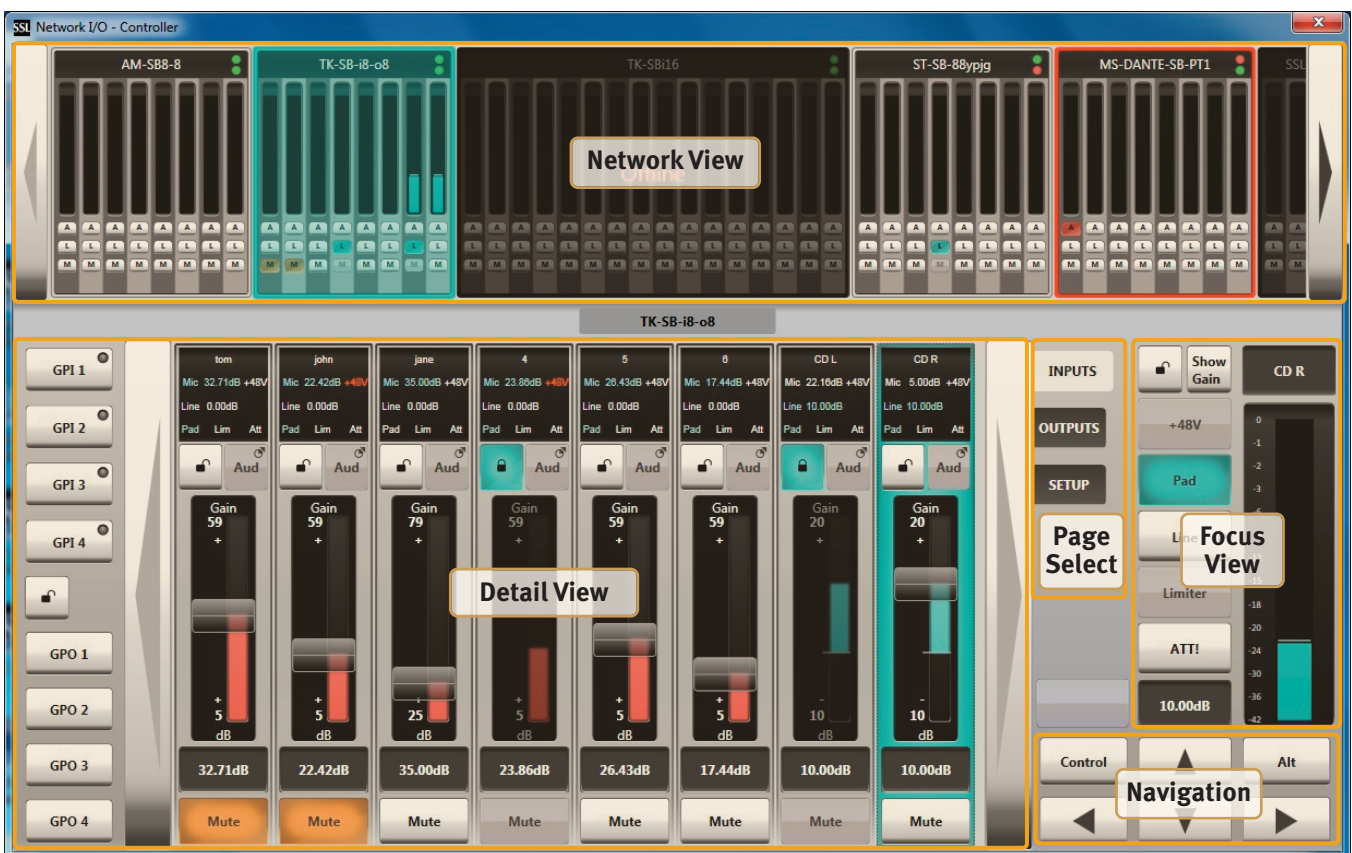


Software Control

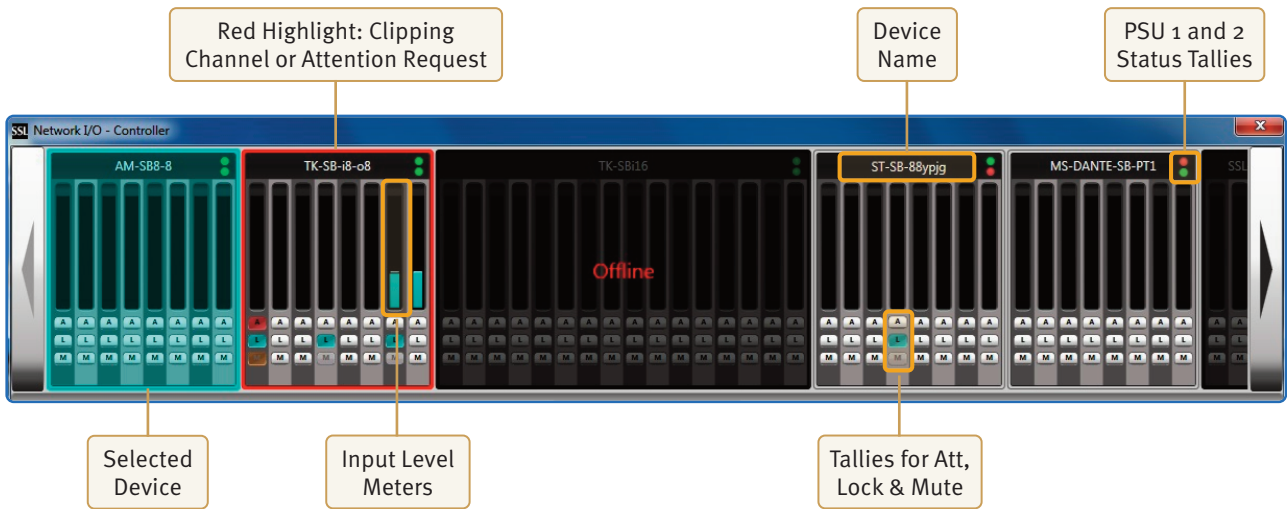
THE GUI

The application window is divided into five sections:

- Network View** Shows each SSL device on the Dante network. Clicking a device brings its parameters into the Detail View. Large arrows on the far left and right scroll for more devices.
- Detail View** Shows channel details for the selected device. Large arrows on the far left and right scroll for more channels.
- Page Select** Selects the detail view to show inputs, outputs, or setup options for each device.
- Focus View** Shows an expanded view of the selected channel.
- Navigation** Switches the in-focus channel and allows for fine gain adjustment. These arrows are also mapped to your physical PC keyboard.



NETWORK VIEW

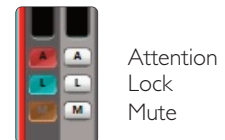


- **Device Name** is set by the *Dante Controller* application.
- A **Red Highlight** indicates a device that requires operator action:
 - A flashing red background indicates a device with a clipping audio channel
 - A solid red border highlights a device with an active Attention flag

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 device.



- **Selected Device** will be highlighted with a cyan background.
- **PSU Tallies** show the status of PSUs 1 and 2 for each stagebox.
- **Att, Lock and Mute** tallies show the status of each function for every stagebox channel. See *View Inputs* on the following page for full details.
- The **Level Meter** shows the real-time signal level for all stagebox input channels. A red clipping indicator is also provided.



Attention
Lock
Mute

*Devices that have been connected to the network while the application is running but have subsequently lost communication show as "**Offline**" in the network view. To remove these devices, close and restart Network I/O – Controller.*

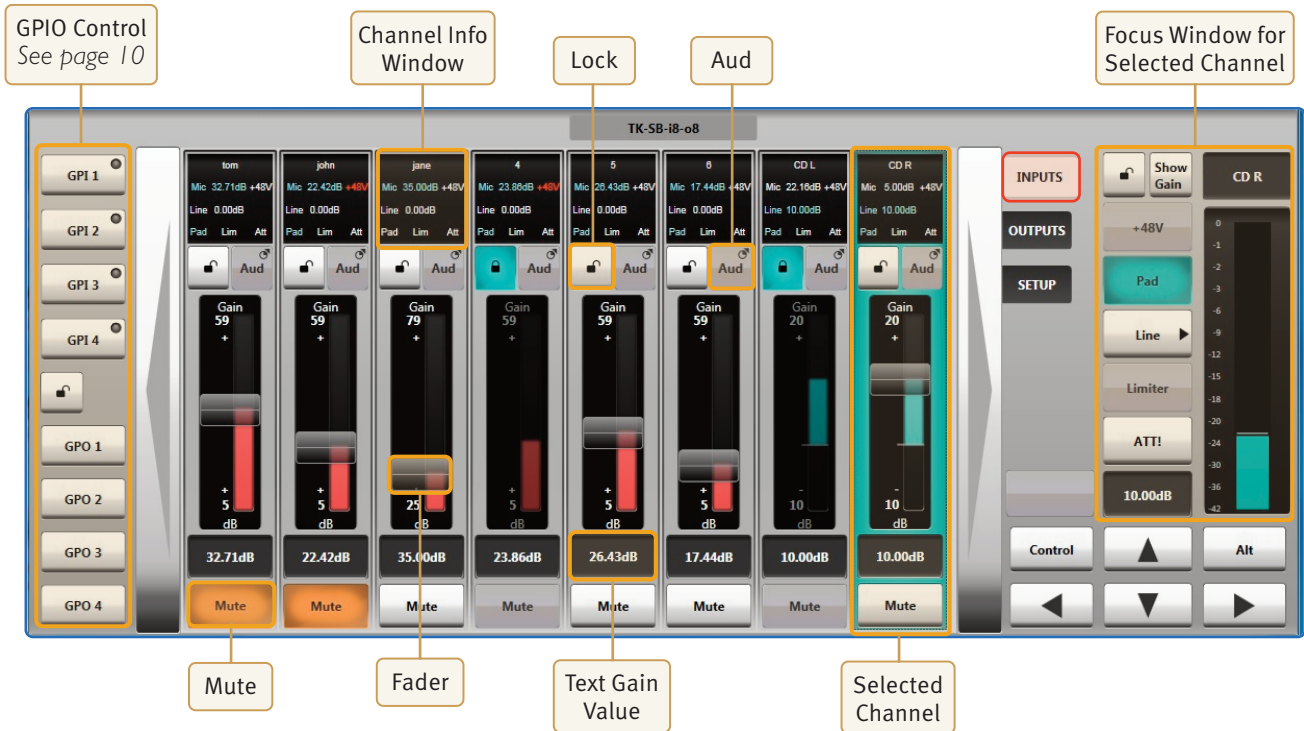
INPUTS AND OUTPUTS

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

The **Setup** button shows the configuration settings for individual stageboxes (see page 11).



View Inputs

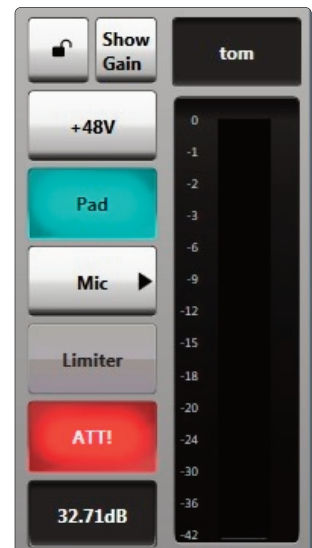


- **Channel Info** shows all parameters of the channel at a glance. The **Att** flag will change to red on channels requesting attention.
- **Lock** prevents accidental changes to all parameters on a channel. *The fader knob is not available on locked channels.*
- **Aud** (Audition) allows for automatic gain setting: Hold **Aud** while audio is present to automatically set the gain based on the source level*.
- **Fader** allows for manual level control via the slider, keyboard arrow keys, or numeric entry by clicking the text Gain Value box.
The fader level bar is coloured red on microphone input channels and cyan on line level inputs.
- **Text Gain Value** box allows a gain setting to be entered directly from your keyboard – double-click to enter a value (*an additional, on-screen keyboard is provided*).
- **Mute** mutes the input or output channel.

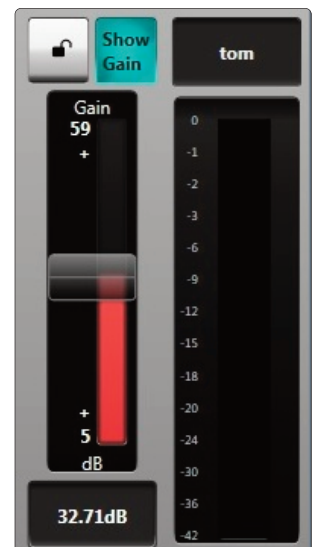
(*Requires V2 firmware)

Focus Window

- **+48V** toggles the mic preamp phantom power. *Selecting Line input will turn off phantom power.*
- **Pad** toggles the -20 dB mic preamp pad. *Also see **Pad Mode** under **Setup**, page 11.*
- **Mic/Line** select toggles the appropriate input gain range and impedance for mic or line level sources.
- **Limiter** toggles the mic preamp limiter. *(Requires V2 firmware.)*
- **Att** (Attention) toggles the hardware front panel LED for fast identification of the physical input or output connector.
 - Multiple channels can have Attention active.
 - All attention signals on a stagebox can be cleared via the **Setup** window.
- **Text Gain Value** box allows a gain setting to be entered directly from your keyboard – double-click to enter a value *(an additional, on-screen keyboard is provided).*
- **Device Name** is set by the *Dante Controller* application.
- **Level Meter** shows the signal level for the selected channel. A red clipping indicator is also provided.
- **Lock** prevents accidental changes to the selected channel.
- **Show Gain** toggles the fader into the focus view window. Gain can be controlled via mouse, keyboard, or numeric entry.



Switch View

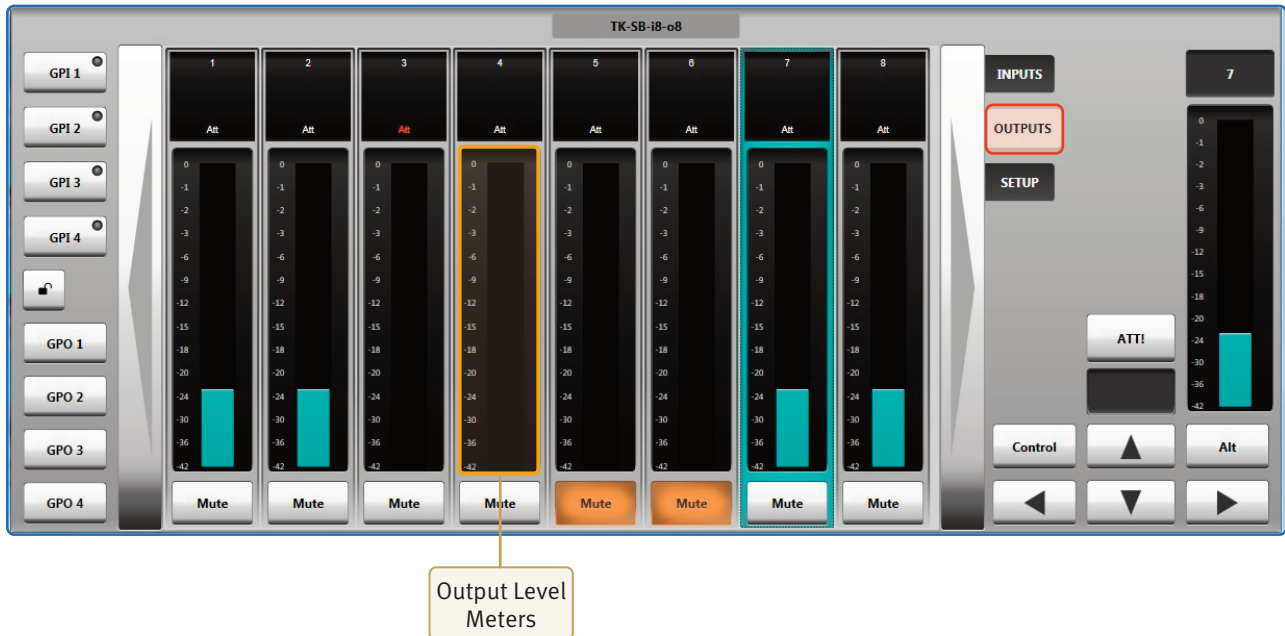


'Show Gain' View

View Outputs

The View **Outputs** window shows a reduced option set. Output level meters are shown; the **Mute** and **Att** buttons function as before.

This view will be blank if the currently selected device is an input-only stagebox.



NAVIGATION

- ◀ ▶ Left and right arrows navigate through the in-focus channel of the selected device.
At the first or last channel of each device navigation will transfer to the adjacent channel of the next device shown in the Network View.
- ▲ ▼ Up and down arrows alter the gain by 1 dB.
- **Alt** toggles the gain step to 3 dB.
- **Control** toggles the gain step to 0.1 dB.



These keys and combinations are mapped to your PC keyboard. For example, pressing ALT+UP on your keyboard will increase the gain by 3 dB.

GPIO

All Stageboxes are equipped with 4 GP input and 4 GP output circuits. Inputs are opto-isolated voltage triggered and output closures are via DIL relay.

See Appendix C, page 14 for connector pinout and contact ratings.

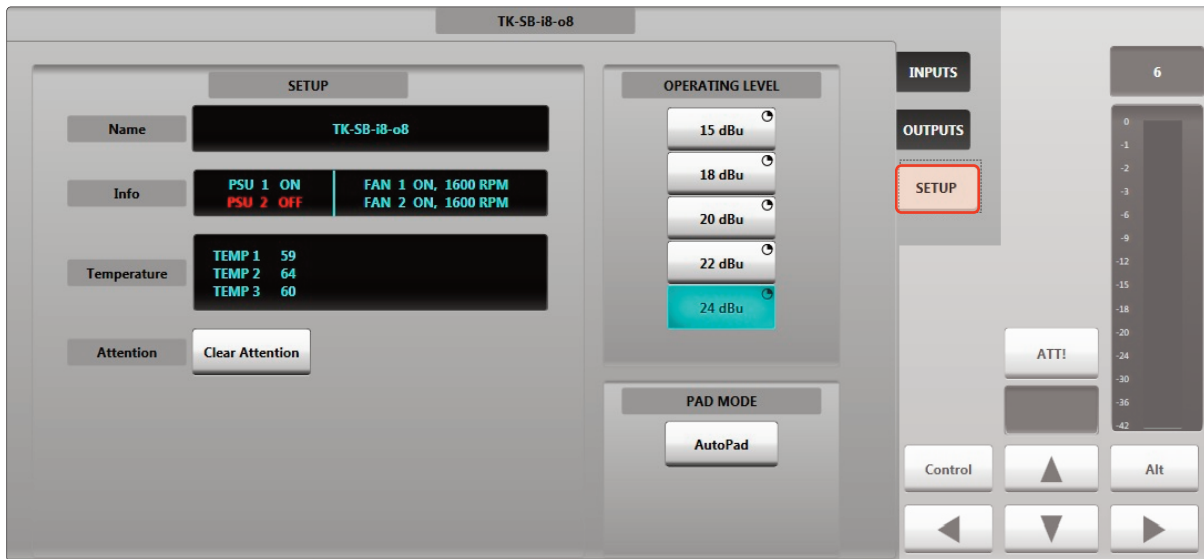
- **GPI** button LEDs show the state of each GP Input circuit.
- **GPO** buttons toggle the latching GP Output.
- **Lock** prevents accidental triggering of the GP outputs.

GPIO routing features will be available in a future software release.



SETUP

Pressing **Setup** in the *Page Select* area shows the system and stagebox configuration information.



- **Name** is set by *Dante Controller* and shows each device name.
- **Info** shows the status of the device's redundant power supplies, fans, and temperature. **Red** indicates a fault.
- **Temperature** shows the temperatures at three locations within the unit.
- **Clear Attention** clears all active attention LEDs on the currently selected device.
- **Operating Level** allows selection of the maximum analogue I/O level in dBu (at 0dBFS) for the device.
- **Pad Mode** toggles between traditional manual mic preamp pad functionality and SSL **AutoPad**.
 - **Traditional** – The 20dB pad can be toggled manually for each channel.
 - **AutoPad** – The pad is automatically included in the fader gain range and silently applied if the gain is set at a low value that would require a pad to achieve. This allows the entire possible mic gain range to be seamlessly available at all times. See diagrams below...



Normal mic gain range without pad



Normal mic gain range with traditional pad engaged



Mic gain range with **AutoPad** enabled

Note that the maximum and minimum gain values are dependant on the Operating Level setting

Dante Controller

For complete details on [Dante Controller software](#), refer to Audinate's [user guide](#). The information below will give you the basics to get started.

Clock sync, device naming and routing are all done within Dante Controller. Dante Controller is the single point of management and no network related management is done in the SSL software.

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.

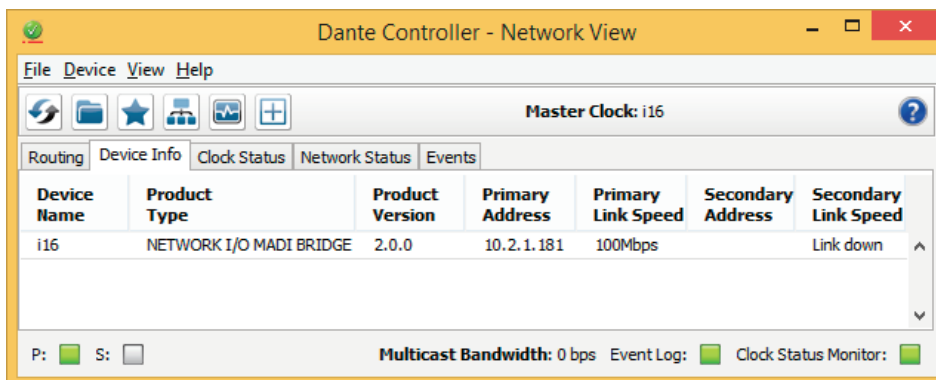
IP CONFIG

Each device requires a DHCP or fixed IP address. In redundant mode, the mode that should be used with SSL devices – the primary and secondary ports must be on separate networks or VLANs.

Device Info tab shows the device IP address.

Device > Device View... menu allows setting of DHCP or fixed IP address.

The device will resolve to a link-local address if it is set to DHCP and no DHCP server is present. To access via link-local, set your PC to DHCP, directly connect to the device, and wait for the link-local addresses to resolve. Link-local addresses use **169.254.n.n**.

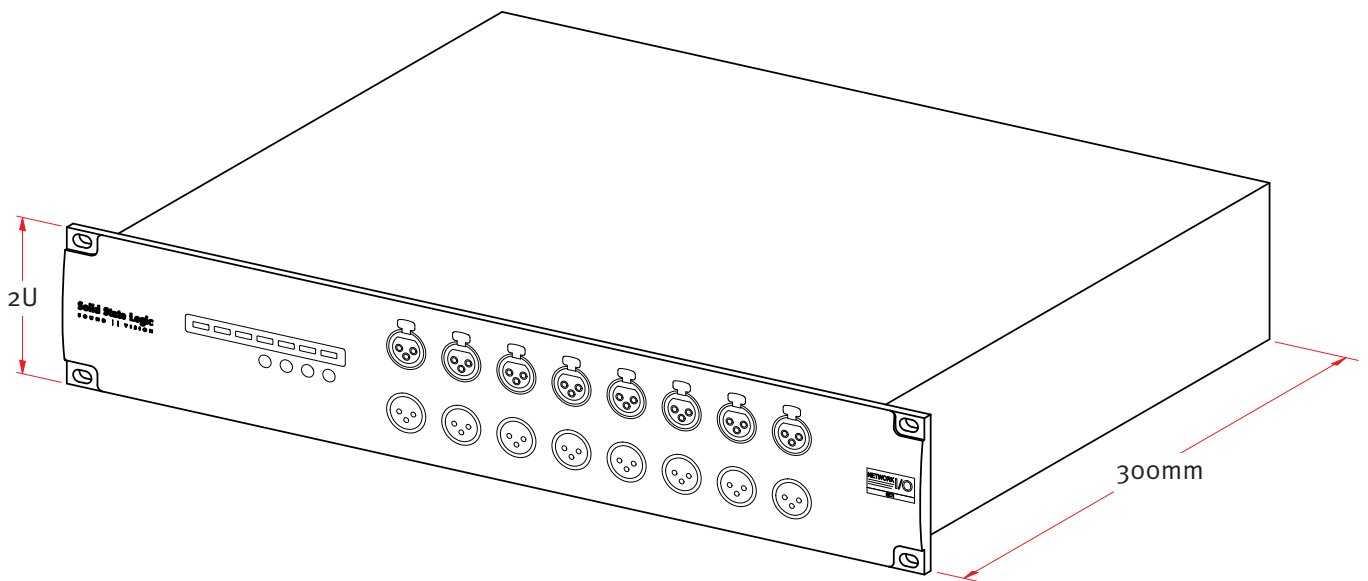


Appendices

APPENDIX A – PHYSICAL SPECIFICATIONS

Specifications are the same for both the SB i.16 and SB 8.8 Stageboxes.

Parameter	Value	Notes
Depth	300 mm (12")	
Height	88.5 mm (1.75")	2 RU
Width	438 mm (17.25") 482 mm (19")	Excluding rack ears Including rack ears
Weight	6.0 kg (13.2 lb)	
Power	< 100 W	
Boxed size	575 x 510 x 280 mm (22.5 x 20 x 11")	
Boxed weight	7.1 kg (15.6 lb)	



APPENDIX B – PERFORMANCE SPECIFICATIONS

Mic/Line Inputs		
Parameter	Value	Notes
Gain Range	+5 to 79 dB	0 dBFS, MDAC continuous gain
Maximum Input Level	+28 dBu	Pad inserted
Frequency Response	± 0.25 dB	Mic mode, -0.5 dBu signal level, 20 Hz – 20 kHz
Equivalent Input Noise	< -123 dB	Typical. Mic mode, 70 dB gain, A-weighted filter, 22 kHz bandwidth
Usable Dynamic Range	> 114 dB	Typical. Mic mode, 0 dBFS, A-weighted filter, 22 kHz bandwidth
Input Impedance	1.5 / 14 kΩ	Mic / Line. Selectable per channel
CMRR	> 55 dB (typically > 65 dB) > 80 dB (typically > 90 dB)	Mic mode, 50 Hz – 20 kHz, 0 dBu Mic mode, 1 kHz, 0 dBu
Crosstalk	< -85 dB (typically < -95 dB)	20 Hz – 20 kHz, 0 dBu
THD+N	< 0.005 % < 0.0015 %	Mic mode, 20 Hz – 20 kHz, -6 dBu, 22 kHz bandwidth Mic mode, 1 kHz, -6 dBu, 22 kHz bandwidth
Sample Rates	48 or 96 kHz	
Resolution	24 bit	
Group Delay	39 samples	Analogue to Dante module*

Measurement Parameters

Sample Rate:	48 kHz
Operating Level:	+24 dBu = 0 dBFS
Mic input termination:	150Ω
Mic Mode Gain:	24 dB (unless stated otherwise)
Reference frequency:	1 kHz (unless stated otherwise)

*Group delay does not include Dante device latency which can be specified in Dante controller, and is deterministic.

Line Outputs (Stagebox SB 8.8)		
Parameter	Value	Notes
Maximum Output Level	+24 dBu	
Output Impedance	< 50 Ω	
Frequency Response	± 0.2 dB - 0.5 dB	-0.5 dBFS, 20 Hz – 15 kHz @ 20 kHz
Usable Dynamic Range	> 113 dB	Typical. 0 dBFS, A-weighted filter, 22 kHz bandwidth
Crosstalk	< -90 dB (typically < -100 dB)	20 Hz – 20 kHz, 0 dBFS
THD+N	< 0.004 % < 0.004 %	20 Hz – 20 kHz, -9 dBFS, 22 kHz bandwidth 1 kHz, 0 dBFS to -20 dBFS, 22 kHz bandwidth
Sample Rates	48 or 96 kHz	
Resolution	24 bit	
Group Delay	31 samples	Analogue to Dante module*

Measurement Parameters

Sample Rate:	48 kHz
Operating Level:	+24 dBu = 0 dBFS
Mic input termination:	150Ω
Mic Mode Gain:	24 dB (unless stated otherwise)
Reference frequency:	1 kHz (unless stated otherwise)

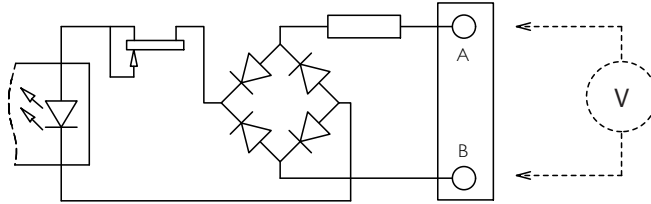
*Group delay does not include Dante device latency which can be specified in Dante controller, and is deterministic.

APPENDIX C – GPIO CONNECTION

GP Outputs – All output switch closures are via DIL relay.
DO NOT use these outputs to directly switch capacitive or reactive loads; always use a separate external relay with suitable contact rating.

DIL Relay Ratings:
 • 100V DC, 125V AC
 • 100mA max.

GP Inputs – Inputs are triggered by applying an AC or DC voltage of between 4V and 24V. The current drawn is approximately 10mA. Minimum input pulse duration 50mS.



GP Inputs / Outputs

Connector Type: 25-way D-type male

Pin	Description	Notes:	
1	Input 1A	<i>See input requirements above</i>	
14	Input 1B		
2	Input 2A		
15	Input 2B		
3	Input 3A		
16	Input 3B		
4	Input 4A		
17	Input 4B		
5			
18			
6			
19			
7	+12V Output		<i>0.5A max (both pins), Linked to pin 13</i>
20	Chassis		
8	Output 1A		<i>Reference for 12V output</i> <i>See contact ratings above</i>
21	Output 1B		
9	Output 2A		
22	Output 2B		
10	Output 3A		
23	Output 3B		
11	Output 4A		
24	Output 4B		
12			
25			
13	+12V Output	<i>As pin 7</i>	

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 Do not obstruct the ventilation cutouts or the exhaust fans.
- 10 Mount in an adequately supported 19” rack.
- 11 Only use attachments/accessories recommended by the manufacturer.
- 12 Unplug the device during lightning storms or long periods of unuse.
- 13 The unit can only be serviced by qualified personnel – Seek immediate service if:
 - The unit has been exposed to moisture
 - The unit has been dropped
 - The unit does not operate normally
- 14 Do NOT modify this unit – alterations may affect performance, safety and/or international compliance standards.
- 15 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 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 is required to fulfill the following standards:
 - a Use mains cords with the rating: AC 50/60Hz, 100–240V. 0.4–0.2A, each cord.
 - b The unit should ALWAYS be earthed with the earth on both the IEC sockets (when both are used).
 - c 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.
 - d Maximum cord length should be 4.5m (15’).
 - e 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 unit is designed for connection to single phase supplies only.
- 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
FIN Laite on liitettävä suojamaadoituskoskettimilla va rustettuumpistorasiaan
NOR Apparatet må tikoples jordet stikkontakt **SWE** Apparatet 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

Initial in-rush current: 1.2A, 5 sec in-rush current: 0.8A

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

NOTES

Solid State Logic

S O U N D | | V I S I O N

Visit SSL at: www.solidstatelogic.com

82VQM01A 1st Release – August 2015

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