

CEDAR



DNS 8D **dialogue noise suppressor**

OWNER'S MANUAL

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AN INTRODUCTION TO THE DNS 8D

The CEDAR DNS 8D has been designed specifically for broadcast and live sound. With eight channels of noise suppression, it hosts a new algorithm that marries the best of the DNS 8D and the DNS 2 dialogue noise suppressors. With its slick user-interface that includes standard and detailed modes of operation it offers better control than any previous dialogue noise suppressor, both from the front panel and from almost any web browser that can access its internal remote control software. With its near-zero latency and standard 4-pin 12VDC input in addition to universal mains power, it's suitable for use in all live situations - not just broadcasting, but also live sound in venues such as theatres, concert halls, conference venues, and places of worship.

Dante® is the de-facto standard for media networking, distributing uncompressed, multi-channel digital audio via standard Ethernet networks with near-zero latency and perfect synchronisation. The DNS 8D is the first DNS with a Dante interface in addition to its AES3 audio connections (DB25 using the AES59 pin-out). With fail-safe AES3 audio bypass implemented in the form of hardware relays that immediately connect the inputs to the outputs in the event of a power failure plus support for Dante's redundant mode of operation which helps to protect against network failure, it can be installed with confidence in critical paths anywhere within the audio chain.

Quality, speed and simplicity are paramount considerations in the DNS 8D, which offers the following:

- **Near zero latency**

A DSP delay of less than 10 samples (typically less than 1/200th of a frame) so there is no loss of lip-sync.

- **Flexibility**

The ability to handle a wide range of noise suppression requirements.

- **Speed and ease of use**

A carefully designed user-interface that maximises speed of use.

- **Modern audio interfaces**

Dante® supporting redundant mode and AES3 with failsafe bypass.

- **Universal mains power supply and 12VDC power**

The ability to work anywhere in the world.

- **Powerful processors**

The latest technology to ensure that it will handle the most complex processing requirements.

- **Remote Control**

The ability to monitor and adjust all audio processing parameters using a range of common web browsers.

SAFETY INSTRUCTIONS

Read these instructions, and follow them.

■ **Water and moisture**

The DNS 8D must not be exposed to rain or moisture. Furthermore, if it is brought directly from a cold environment into a warm one, moisture may condense inside it. This, in itself, will not cause damage, but may cause electrical shorting. This could damage the unit, and even cause danger to life. Always allow the unit to reach ambient temperatures naturally before connecting the mains power.

■ **Mounting and ventilation**

You should place the DNS 8D on a flat, stable surface or mount it in a standard 19" equipment rack. Use the supplied rubber feet to avoid scratching the surface, or the rackmounting accessories, as appropriate.

Do not subject the unit to strong sunlight, excessive dust, mechanical vibration or periodic shocks. It is not susceptible to excessive heat build-up, but should be installed away from heat sources such as radiators and audio devices that produce large amounts of heat.

■ **Power sources**

The DNS 8D features a universal AC power supply that will work safely on any mains supply in the range 85V to 260V, 50/60Hz AC only. A unit used in this way should always be grounded (earthed), and you should route power cables so that they will not be walked on or pinched. Unplug the supply cord to isolate the apparatus from the supply if it is not to be used for some time. Grasp the supply cord by the plug, never by the cord itself.

A nominally 12VDC input that accepts 8V - 18V DC is also provided.

■ **Connections**

Turn off the power to all equipment before making any connections.

In order to comply with EMC regulations, you must use metal-shelled connectors and good quality shielded cable suitable for AES3 connections and good quality CAT6 network cable for Ethernet connections.

■ **Cleaning**

Clean the DNS 8D only with a dry cloth. Never use abrasive pads, water or liquid cleaners such as alcohol or benzene.

■ **Damage requiring service**

The DNS 8D contains no user-serviceable parts and should on no account be opened or dismantled by unauthorised personnel.

A unit should be returned to qualified service agents when it has been exposed to liquids, when it fails to function correctly, when it has been dropped, or when the case is damaged.

SETTING UP THE DNS 8D

Unpack the DNS 8D carefully. Save the carton and all packing materials since you may need them to transport the unit in the future. In addition to the DNS 8D and its packaging, the box should contain the following:

- a mains connection lead
- an Ethernet patch cable
- four rubber feet
- rackmounting screws
- a warranty registration card
- a DB25 breakout cable (if ordered with the unit)

To maintain reliability and prolong operating life, observe the following environmental considerations:

- the temperature should be maintained between 5 and 30 Celsius
- relative humidity should be in the range 30% to 80% non-condensing
- strong magnetic fields should not exist nearby.

Audio connections



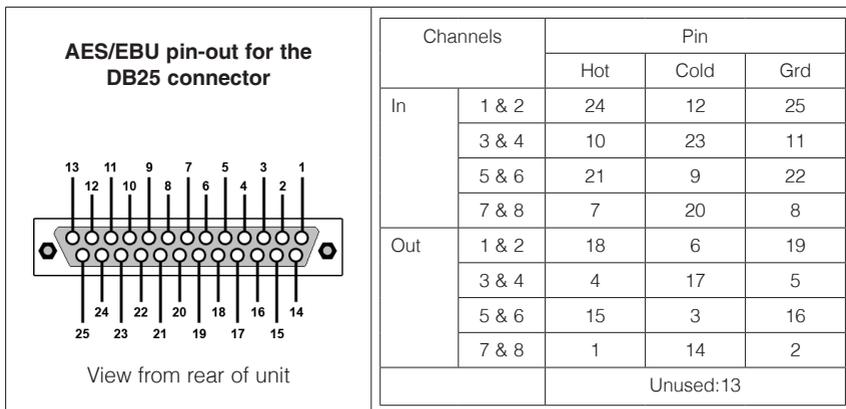
The DNS 8D offers two audio interfaces, **Dante®** and **AES3**, and supports operation at 44.1kHz, 48kHz and 96kHz. It switches between these automatically; if an AES3 signal is detected on channels 1&2 then the AES3 interface is used, otherwise Dante is used. It does not bridge the two interfaces so you cannot input using one and output using the other.

Power

Both power inputs may be connected simultaneously, in which case the AC input will be used to power the unit. When both inputs are connected, you may disconnect the AC input and the unit will continue to operate on DC power without shutting down or restarting.

AES3

Connect the DNS 8D to your other audio devices using the DB25 connector wired according to AES59 - also known as the 'Tascam pinout'. A suitable cable is available from CEDAR as an optional accessory.



The clock is derived only from channels 1 & 2 so you must use this connection first; use of the other channel pairs is optional. When used, the signals feeding the other AES inputs must be at the same sample rate and synchronous or clicks, ticks, or even loud broadband noise may result from the consequent data errors.

Fail-safe bypass

The DNS 8D offers AES3 fail-safe bypass as standard. In the event of a power failure the AES inputs become connected directly to the AES outputs by relays, bypassing the active electronics of the unit. Once triggered, the fail-safe bypass can be cleared by power-cycling the unit.

Dante®

When using Dante, connect the primary Dante Ethernet port to your Dante network. By default, the Dante interface is set to use Switched mode and will obtain an IP address by DHCP. Assuming an IP address is obtained, the DNS 8D will appear in Dante Controller and you can route audio through it using the Dante tools.

Refer to the Dante documentation if your Dante network uses redundant mode or static IP addressing.

Control

To use the browser-based remote control facility, connect the Control Ethernet port to your network. If you are using Dante audio with its default settings, you can do this by linking the Control Ethernet port to the Secondary Dante Ethernet port using the short RJ45 patch cable provided.

The Ethernet control connection also allows you to upgrade the firmware.

OPERATION



Power/Lock

The DNS 8D switches on automatically when power is applied. This guarantees that it reboots after a power failure. Switch it off by pressing and holding the power/lock button for about three seconds. The current settings will be stored during shutdown. If the unit is not shut down correctly, settings may not be stored.

Press the power/lock button briefly to lock the soft keys (menu, shift, S1, S2 and S3) and the encoders. Hold down the same button for around three seconds to unlock the controls. You must unlock the panel to be able to shut down the unit.

Menus

Press the **menu** button to enter the menu system for advanced operation.

Shift ▲

Hold the shift key to show alternative functions. Press it briefly to switch between the normal and alternative functions.

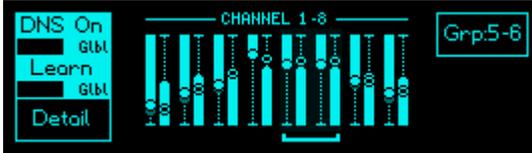
Soft keys (S1, S2, S3)

When first switched on, the soft keys perform the following tasks:

S1 (DNS On)	
Click:	toggle the current channel/group on/off
Shift-click:	toggle global on/off
S2 (Learn)	
Click:	start learning on the current channel/group. Click again to stop
Shift-click:	toggle global learn
S3 (Detail)	
Click:	toggle between Detail and default (summary) views
Press/hold/release:	preview the detail of the current channel/group on the main screen

THE SCREENS

Main screen - Summary mode



The main screen provides visual feedback regarding the current operation of the unit as well as displaying the menus and associated parameters.

In normal use, the four boxes provide information regarding the operation of the DNS 8D:

- The Processing status
- The Learn status
- Whether Detail mode is selected
- The channel or group of channels currently selected.

In normal use the screen also displays a summary of the setup of all eight channels. The channel settings - Attenuation (left) and Bias (right) - are displayed for each channel and these are overlaid on signal processing and power activity bar graphs.

Individual screens - Summary mode

The two bar graphs in each individual screen display the same information as the equivalent pair on the main screen.

Main screen - Detail mode



In Detail mode, the main screen displays six control bands for the selected channel or group of channels, each offering Attenuation and Bias parameters. This allows the user to control the noise suppression more precisely when needed.

The A and B columns to the right of the screen display the average Attenuation and Bias for all bands and are the same as are shown on the summary screen for that channel or group.

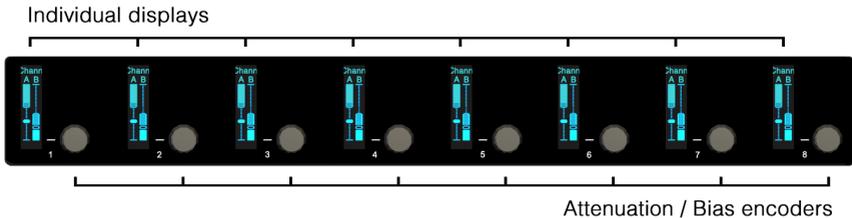
Individual screens - Detail mode

The first six displays (1 - 6, viewed from left to right) show the Attenuation and Bias information for a given channel or group on a band-by-band basis, with the lowest frequency band shown within the furthest left display, and the highest frequency band shown within the sixth display.

The seventh display shows the average Attenuation and Bias across all bands - i.e. the summary display.

The eighth display shows which channel or group of channels is currently in focus.

THE ENCODERS



The encoders allow you to attenuate the detected noise and, if desired, to bias the noise detector toward more or less noise. In Summary mode, these actions are performed on a channel-by-channel basis. In Detail mode they are performed upon a given band within a selected channel or group.

The focus of each encoder is indicated by a filled-in circle in its associated display, and the process status is denoted by filled (on) or hollow (off) bar graphs.

An Attenuation or Bias value is displayed on the main screen while you adjust it as well as on the relevant individual display.

The full range of operations is:

Rotate:	Adjust the Attenuation / Bias
Click:	Toggle the focus between the Attenuation and Bias
Click and hold	Restore default parameters for that channel / band
Multi-click:	Click two encoders near-simultaneously to create/delete channel groups (see below)

IN USE

DNS On/Off

Use S1 to switch processing on or off for the selected channel or group. Use SHIFT-S1 to switch processing on or off globally.

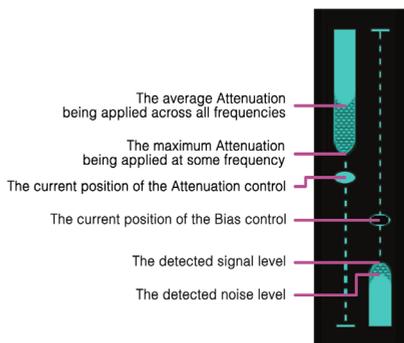
Learn

With Learn (S2) on for any channels or groups of channels, the DNS 8D continually identifies the power and spectral distribution of the noise present. When Learn is Off, the noise identification is frozen at the last determined values. If Learn is Off when the unit is switched off, the current noise measurement will be saved and recalled when the unit is next switched On. Use SHIFT-S2 to switch Learn on or off globally.

Learn is **not** a method for taking a noise fingerprint and, in most circumstances, best results are obtained by leaving it on permanently.

Attenuation

The default action of each encoder is to adjust the amount of noise Attenuation applied to the signal, as shown on the left-hand side of each display. The representation of the fader within the display shows the current position of the control, and the bar graph shows the instantaneous amount of Attenuation being applied. The solid bar shows the average attenuation across all frequencies, and the shaded bar shows the maximum attenuation across all frequencies.



Bias

The encoder also provides control of the Bias, which is shown on the right-hand side of each display. Click an encoder to enable adjustment of the Bias, and click it again when you wish to switch back to controlling the Attenuation. The Bias is a 'centre-zero' control, and the fader shows its current position. Raise the Bias to increase the amount of noise detected. This will allow the process to remove more noise, but may lead to compression of the wanted audio and make the signal sound dry or gated. Lower the Bias to decrease the amount of noise detected. This will allow the process to retain more 'atmos', but may allow noise to leak back into the wanted signal. In most cases, the optimum value for the Bias is zero.

The right-hand bar provides information about the signal to noise ratio (SNR). The solid bar shows the detected noise level, and the shaded bar shows the instantaneous signal level; consequently, the difference between the heights of the solid and shaded bars indicates the SNR.

- **Learn** and **Bias** determine **what** is detected as noise.
- **Attenuation** determines **how much** of the detected noise is suppressed.

Groups

Grouping channels together makes them adopt identical settings, and allows you to adjust them together. Group channels by clicking two encoders simultaneously or in quick succession. For example, pressing encoders 1 and 4 will group channels 1, 2, 3 and 4 together. Pressing them again removes the grouping. When channels are grouped, you can adjust their Attenuations and Biases using any of the grouped encoders.

The Learn function continues to work independently for each channel in a group.

You may set up any combination of individual channels and groups provided that the following criteria are met:

- All channels in a group must be adjacent.
- No channel can be in two groups simultaneously.

This architecture allows you to create desirable combinations such as dual 4-channel operation, or four stereo pairs.

Detail view



When booted using the default settings, each of the encoders is mapped to a single audio channel. With Learn On, you can then determine the noise Attenuation and Bias for each channel as described above. However, you can also control the noise reduction in each channel in far greater detail using Detail mode.

Press S3 in the default display to enter the Detail view. This offers a multi-band view of the current channel, and allows you to control each of the bands independently. The main display shows two banks of six faders. The bands that they represent are spaced from approximately 100Hz (leftmost) to approximately 16kHz (rightmost).

Screens and encoders 1 - 6

These allow access to the settings for the individual bands as follows:

Rotate:	adjust the Attenuation and Bias in each of the six bands
Click:	toggle the focus between the Attenuation and the Bias
Press/Hold/Release:	reset this band

Screen and encoder 7

Screen 7 displays the Summary information for the selected channel, and encoder 7 operates as it does in the summary view:

Rotate:	Adjust the Attenuation / Bias
Click:	Toggle the focus between the Attenuation and Bias
Click and hold	Restore default parameters for that channel / band

Screen and encoder 8

These allow you to step through the channels/groups.

Tutorial

If you wish to determine in more detail how the DNS 8D processes each channel, you should use Detail mode to adjust the Attenuations and Biases in each of its six control bands. But please remember... the DNS 8D is not a six-band device; the six control bands were chosen as the best compromise between the amount of control needed and the complexity of the system.

The following method is one way to achieve the optimum settings for any given situation:

A suitable starting point

Select Detail mode. Now press and hold encoder 7 to set all of that channel's (or group's) Attenuations and Biases to their default values of -10 and 0 respectively. Now select the Attenuation (A) on encoder 7 and raise all of the Attenuations to 0.

Adjusting the Attenuation in an individual band

Ensure that Learn is On. While listening to the audio, adjust the Attenuation in a chosen band to reduce or eliminate the noise. If you feel that the unit is misidentifying the noise content in that band you can increase the Bias to capture and therefore attenuate more noise, or reduce the Bias to allow more atmos to survive.

Setting up across the whole spectrum

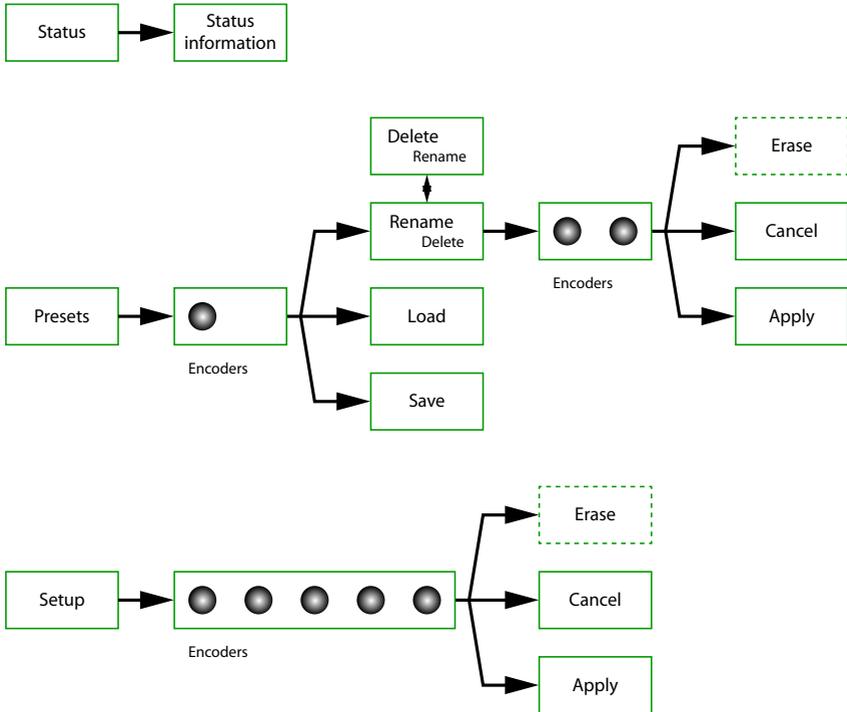
Repeat this exercise for each band. You may choose to do this while leaving previous bands as you have set them, or by reverting to the starting point and investigating each individually before setting up all six bands in the channel.

Once you have chosen and applied suitable setting for all six bands, you may wish to refine some of them.

MENUS

Select the menus by pressing the **menu** button. Select the desired submenu by pressing the **S1**, **S2** and **S3** buttons. When appropriate, press the **menu** button to leave the menu system.

The menu map is as follows:



Some menus provide options to move around on screen and to edit characters or values in specific locations.

Status

The status page reports the current audio and network status of the DNS 8D. No editing is possible on this page.

```
DNS 8D (DNS-8-10049 V1.0)
Input Dante Sample Rate: 48000
Ctrl Eth (00:50:C2:7C:A5:36): 192.168.2.245 (A)
Dante Pri (Re) (00:50:C2:7C:A5:37): 169.254.214.24 (A)
Dante Sec (Re) (00:50:C2:7C:A5:38): 172.31.214.25 (A)
```

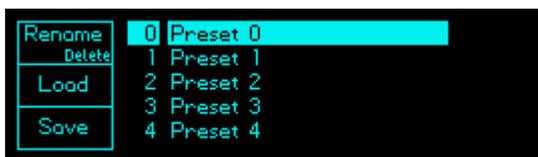
In the example above, 48kHz audio is being received via the Dante interface. The page is also reporting the unit's MAC and IP addresses.

Notes about the Dante fields:

- Re: Dante is running in redundant mode
- Sw: Dante is running in switched mode
- A: DHCP On (server dynamically assigns an IP address and other network configuration parameters)
- S: DHCP Off (static IP address)

For further explanation of these values, please refer to your Dante documentation.

Presets



The DNS 8D contains 100 memory locations ("presets") numbered 0 to 99. Each preset stores the process settings of all eight channels, including grouping when appropriate. If Learn is switched Off, the frozen noise measurement is also stored as part of the preset. However, presets do not store setup information such as the screen brightness.

Press the **menu** button followed by **S2** (Presets) to enter the preset manager.

Select a preset using encoder 1.

The three possible actions on each of the soft keys then perform the following functions:

S1 (Rename)	
Encoder 1:	select a character
Encoder 2:	change the selected character
Erase / Cancel / Apply:	perform the specified action
SHIFT-S1 (Delete)	
---	delete the selected preset
S2 (Load)	
---	load the selected preset
S3 (Save)	
---	save the current settings to the selected preset slot

Setup

Press **menu** followed by **S3** to access the Setup pages.



Page 1



Page 2

- Select a setup option using encoder 1.
- Edit the selected option using encoders 2 to 5, as available.

Username and password

Use these fields to set the case-sensitive username and password that will be requested by web browsers to enable remote control of the unit. The defaults are:

Username: DNS8D
Password: DNS8D

Note for network administrators:

The DNS 8D is intended for use on private networks only. The username and password help to prevent unauthorised changes of settings but do not protect the unit from malicious network attacks.

DHCP On/Off

Dynamic Host Configuration Protocol automatically sets up the unit to work on your local network. No manual changes to the addresses are possible in this mode. When On, DHCP determines the Address, Netmask and Gateway.

When Off, you may set these manually.

Note for network administrators:

The DNS 8D sends its serial number as its host name in DHCP requests. If your DHCP server registers host names in the domain name server, you can access your DNS 8D as **dns-8-xxxxx.yourdomain.com** instead of directly by its numeric IP address.

When configured correctly, the DNS 8D will respond to ICMP echo requests (pings) to its control Ethernet IP address

Screensaver

Select the length of time that passes between the last adjustment and the screen saver dimming the screens to prolong their lives. Options are 5, 30 or 180 minutes, or Off.

Brightness

Select the screen brightness. Options are high, medium and low.

On boot

Determine the action undertaken by the DNS 8D upon startup.

Options are:

Load P0: Load Preset 0. This allows you to create a default setting that is always loaded on power On.

Reset settings: The unit boots with the factory default settings.

Restore settings: The unit boots with the last used settings.

REMOTE CONTROL



The DNS 8D incorporates its remote control software in the form of an internal web page, and you may connect to this using a suitable browser. To access it, connect the DNS 8D's control port to your Ethernet network. It will attempt to obtain an IP address from the network using DHCP and then register its serial number as its hostname. Once this is complete, enter the unit's address...

<http://dns-8-nnnnn.yourdomain.com>

... (where dns-8-nnnnn is the unit's serial number) into your browser window's address bar. Enter the **Username** and **Password** for the unit (the defaults are both "DNS8D") and you will obtain two panels corresponding to the **Summary** and **Detail** screens displayed on the DNS 8D itself. These panels can be hidden and shown using the buttons in the upper left-hand corner of the screen.

The **Presets** button (top right) provides access to the presets, and the Summary panel displays **Group** buttons that allow you to group and ungroup channels. At the bottom of the screen you will find global **DNS On/Off** and **Learn** buttons.

You can edit the channel names by clicking in the appropriate fields and typing new names. These names will be echoed on the unit itself and in Dante Controller. You can save and recall sets of channel names using the device preset facilities within Dante Controller.

Compatibility

The DNS 8D is compatible with all major browsers including Chrome, Edge, Explorer (v9 and higher), Firefox and Safari. It may be accessed by multiple browsers simultaneously, and changes made on one browser will be displayed on any others connected to the unit. However, the company does not guarantee error-free use in this manner, and multi-client use is not supported by CEDAR Audio Ltd.

SETTINGS

You may set up the DNS 8D over the network using a standard web browser.

Determine the address of your DNS 8D by inspecting the Status window, then launch your browser and type the following into the address bar...

xxx.xxx.xxx.xxx/settings.html

...where xxx.xxx.xxx.xxx is that address.

Warning: Do not change the Network settings unless you are confident in your ability to do so correctly.

Note that the DNS 8D is intended for use on trusted networks only. The authentication mechanism required for the browser interface protects against accidental changes of settings (for example, where multiple units are installed on a single network for multiple rooms or broadcasts) but it does not protect the DNS 8D from malicious attacks.

CEDAR DNS 8D Settings Page

Network Mode:

DHCP Static IP

IP Address:

Netmask:

Gateway:

Username & Password:

Username:

Password:

MAC Address: 98:8E:C2:7C:AA:8D
Hostname: DNS-8-19225

DSP Version: 2.1
FPGA Version: 2.0
Application Version: 1.2

PRESET MANAGER

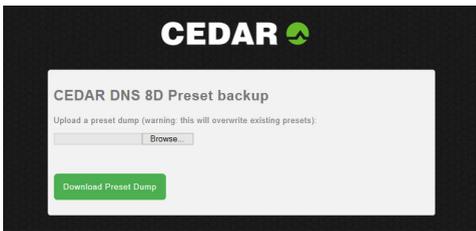
You may save and reload complete banks of presets over the network using a standard web browser.

Determine the address of your DNS 8D by inspecting the Status window, then launch your browser and type the following into the address bar...

xxx.xxx.xxx.xxx/presetbackup.html

...Where xxx.xxx.xxx.xxx is that address.

The following screen (or a similar one performing the same function, depending upon browser) will appear.



Click on **Download Preset Dump** to create a file containing all 100 memories within the DNS 8D.

Click on **Browse** to select and reload a previous dump.

Presets are always saved and loaded as complete banks of 100. It is not possible to save or load individual slots.

FIRMWARE UPDATES

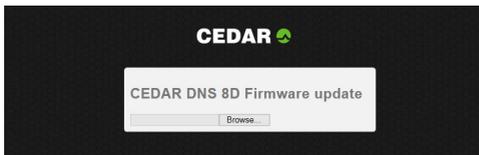
The DNS 8D firmware may be upgraded over the network using a standard web browser.

Determine the address of your DNS 8D by inspecting the Status window, then launch your browser and type the following into the address bar...

xxx.xxx.xxx.xxx/update.html

...where xxx.xxx.xxx.xxx is that address.

The following screen (or a similar one performing the same function, depending upon browser) will appear.



Click on **Browse** and select the new firmware file, which will have been downloaded from the web or sent to you directly by CEDAR Audio Ltd.

When the upload is complete, the DNS 8D's front panel will instruct you to power cycle the unit. You must do this by removing the power cable or by switching off the power at the mains before switching the unit on again. (Switching off using the front panel controls will not be sufficient.)

If there is a problem with the selected file or you have selected the wrong file, you will again be instructed to power cycle the unit to reboot it.

DECLARATION OF CONFORMITY

Date of issue	30 September 2019
Equipment	CEDAR DNS 8D
Manufacturer	CEDAR Audio Ltd
Address	20 Home End, Fulbourn, Cambridge CB21 5BS, UK

This is to certify that the aforementioned equipment, when used in accordance with the instructions in this manual, fully conforms to the protection requirements of the following EC Council Directives: on the approximation of the laws of the member states relating to:

- **2004/108/EEC Electromagnetic Compatibility Directive**
Applicable standards: EN 55032-2015
EN 55035 - 2017
- **2006/95/EC Low Voltage Directive**
Applicable standard: EN 62368-1-2014+A11-2017

Restriction of Hazardous Substances (RoHS) Directive

All hardware products and sub-assemblies manufactured by CEDAR Audio Ltd are designed to be compliant with Directive 2015/863/EU, Restriction of Hazardous Substances. The manufacturing processes include the assembly of purchased components and/or sub-assemblies from various sources. Any statement of RoHS compliance made by CEDAR Audio Ltd may be based, in part or in full, on statements provided by suppliers. Thus whilst every effort is made to ensure compliance, CEDAR Audio Ltd may not have undertaken independent tests to establish the compliance of such components and/or sub-assemblies.

Waste Electrical and Electronic Equipment (WEEE) Directive

In accordance with Directive 2002/96/EC, Waste Electrical and Electronic Equipment, CEDAR Audio Ltd will be happy to provide its customers with information about local organisations that can reprocess CEDAR products that have reached their end of use. Alternatively such products can be returned to CEDAR Audio Ltd in the UK at the owner's cost and they will then be reprocessed correctly free of charge.

E&OE.

The Company reserves the right to change specifications without notice.

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Worldwide Dealer List:

For a current dealer list visit www.cedaraudio.com.

SPECIFICATIONS

General

Power supply:	85–260VAC; 50–60Hz
Power consumption:	15W
I/O type:	Digital PCM
I/O resolution:	24 bits
Sample rates:	44.1, 48, 96kHz
Latency:	<10 samples
Data format:	AES/EBU

Dante®

Modes:	Switch / Redundant
Resolution:	PCM16, PCM24, PCM32
Sample rates:	44.1, 48, 96kHz
Latency:	Dante latency + 10 samples (max)
Network:	Gb Ethernet
Other:	AES67 support

The CEDAR DNS 8D includes licence from Audinate Pty Ltd under US Patents 7747725, 8005939, 7978696, 8171152, European Patent 2255541, Chinese Patent ZL200780026677.0 and other patents pending or issued, see www.audinate.com/patents.

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