

# CEDAR



## **DNS 8D** **dialogue noise suppressor**

OWNER'S MANUAL

© 2019 - 2020 CEDAR Audio Ltd

Manual version 1.20: February 2020

Intentionally left blank

# Table of Contents

An Introduction to the DNS 8D .....	4
Safety instructions .....	5
Setting up the DNS 8D .....	6
Operation.....	8
In Use .....	11
Menus.....	14
Remote control .....	18
Settings.....	19
Preset Manager .....	20
Firmware updates.....	21
Declaration of conformity .....	22
Contact information .....	23
Specifications .....	24
Licence and Limited Warranty .....	28

# 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



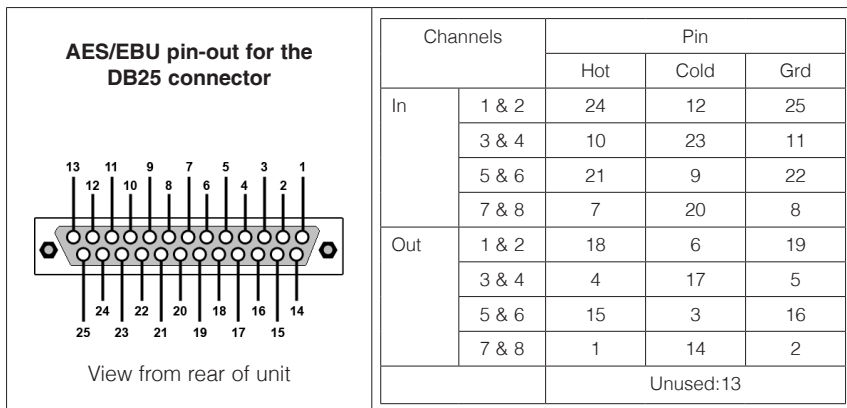
The DNS 8D offers two audio interfaces, **Dante®** and **AES3**, and supports operation at 44.1kHz, 48kHz and 96kHz. It switches between these automatically; if an AES3 signal is detected on channels 1&2 then the AES3 interface is used, otherwise Dante is used. It does not bridge the two interfaces so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

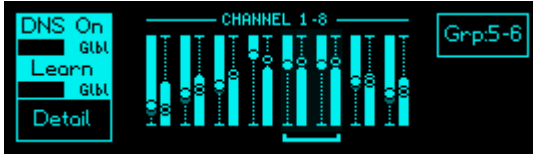
When first switched on, the soft keys perform the following tasks:

<b>S1 (DNS On)</b>	
Click:	toggle the current channel/group on/off
Shift-click:	toggle global on/off
<b>S2 (Learn)</b>	
Click:	start learning on the current channel/group. Click again to stop
Shift-click:	toggle global learn
<b>S3 (Detail)</b>	
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:

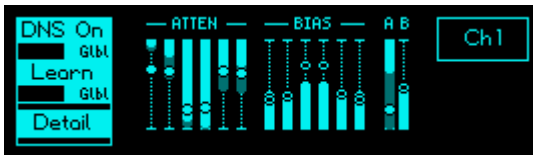
- The Processing status
- The Learn status
- Whether Detail mode is selected
- The channel or group of channels currently selected.

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.

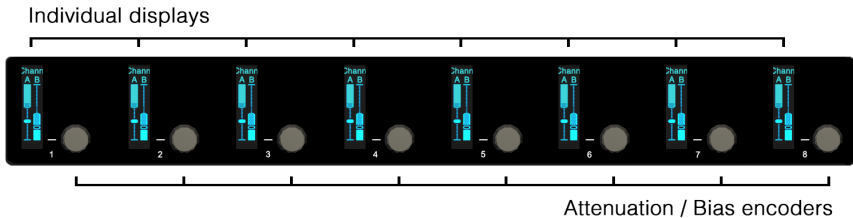
## Individual screens - Detail mode

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.

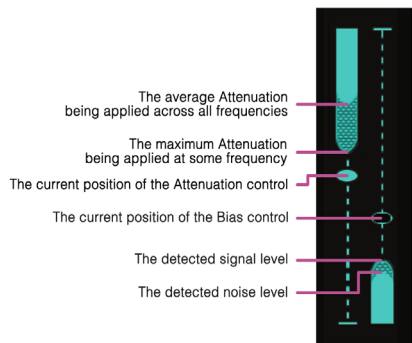
## Learn

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.

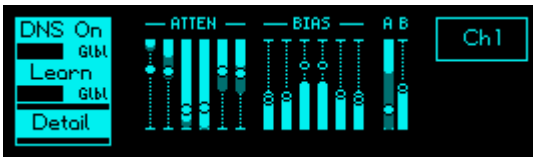
The Learn function continues to work independently for each channel in a group.

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

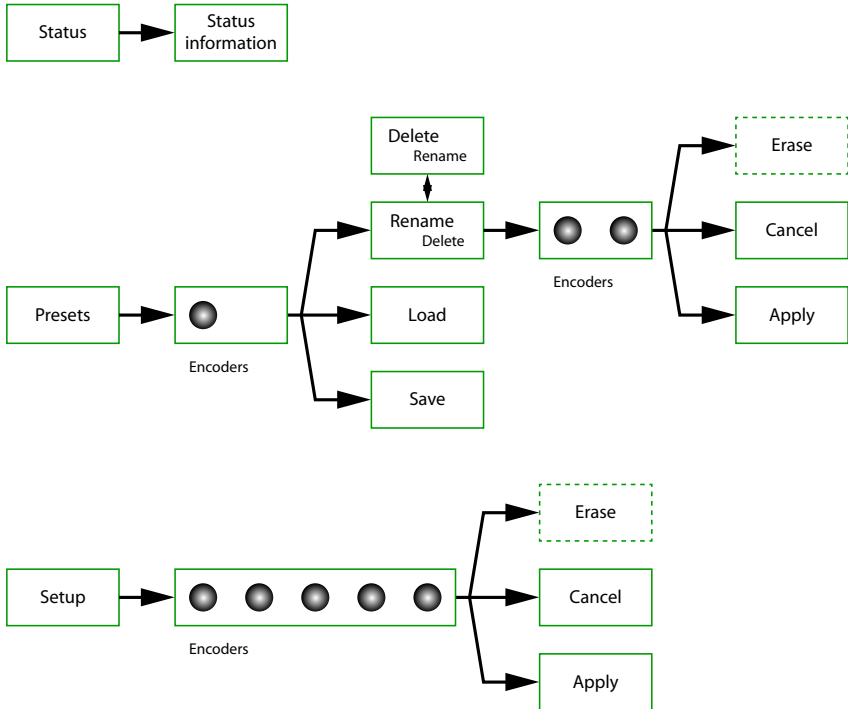
Repeat this exercise for each band. You may choose to do this while leaving previous bands as you have set them, or by reverting to the starting point and investigating each individually before setting up all six bands in the channel.

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)
```

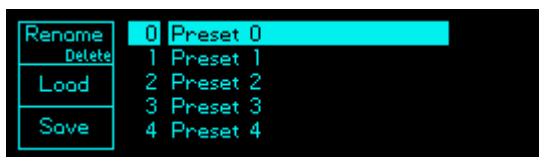
In the example above, 48kHz audio is being received via the Dante interface. The page is also reporting the unit's MAC and IP addresses.

*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:

<b>S1 (Rename)</b>	
Encoder 1:	select a character
Encoder 2:	change the selected character
Erase / Cancel / Apply:	perform the specified action
<b>SHIFT-S1 (Delete)</b>	
---	delete the selected preset
<b>S2 (Load)</b>	
---	load the selected preset
<b>S3 (Save)</b>	
---	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: 98:96:CD:7C:AA:8D  
Hostname: DNS-8-19225

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

# PRESET MANAGER

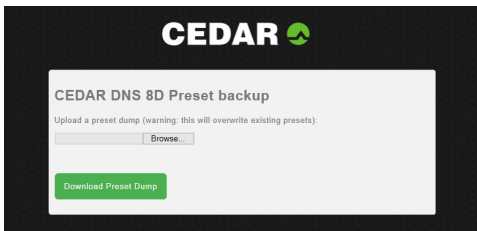
You may save and reload complete banks of presets over the network using a standard web browser.

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

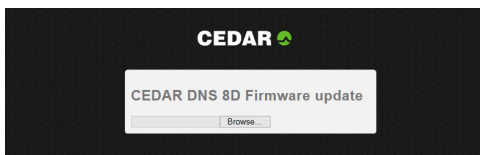
The DNS 8D firmware may be upgraded over the network using a standard web browser.

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.*

# CONTACT INFORMATION

## Headquarters:

CEDAR Audio Ltd,  
20 Home End, Fulbourn, Cambridge, CB21 5BS, United Kingdom  
t: +44 1223 881771  
f: +44 1223 881778  
e: support@cedaraudio.com

## USA Office:

CEDAR Audio USA  
82 Gilman Street, Portland, ME 04102, USA  
t: +1 207 828 0024  
f: +1 207 773 2422  
e: cedarusa@cedaraudio.com

## German Office:

CEDAR Deutschland  
Görlitzer Str. 3, D-49525 Lengerich, Deutschland  
t: +49 5481 945087  
f: +49 5481 945088  
e: info@cedaraudio.de

## Web:

[www.cedaraudio.com](http://www.cedaraudio.com)

## Worldwide Dealer List:

For a current dealer list visit [www.cedaraudio.com](http://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](http://www.audinate.com/patents).

Audinate®, the Audinate logo and Dante® are trademarks of Audinate Pty Ltd.



# 3RD-PARTY LICENCES

The CEDAR DNS 8D firmware includes certain elements that are distributed under the following licences.

=== FreeRTOS LICENSE =====

Copyright (C) 2017 Amazon.com, Inc. or its affiliates. All Rights Reserved.

Permission is hereby granted, free of charge, to any person obtaining a copy of this software and associated documentation files (the "Software"), to deal in the Software without restriction, including without limitation the rights to use, copy, modify, merge, publish, distribute, sublicense, and/or sell copies of the Software, and to permit persons to whom the Software is furnished to do so, subject to the following conditions:

The above copyright notice and this permission notice shall be included in all copies or substantial portions of the Software. If you wish to use our Amazon FreeRTOS name, please do so in a fair use way that does not cause confusion.

THE SOFTWARE IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE SOFTWARE OR THE USE OR OTHER DEALINGS IN THE SOFTWARE.

=== NGINX-LICENSE.TXT =====

Copyright (C) 2002-2020 Igor Sysoev

Copyright (C) 2011-2020 Nginx, Inc.

All rights reserved.

Redistribution and use in source and binary forms, with or without modification, are permitted provided that the following conditions are met:

1. Redistributions of source code must retain the above copyright notice, this list of conditions and the following disclaimer.
2. Redistributions in binary form must reproduce the above copyright notice, this list of conditions and the following disclaimer in the documentation and/or other materials provided with the distribution.

THIS SOFTWARE IS PROVIDED BY THE AUTHOR AND CONTRIBUTORS "AS IS" AND ANY EXPRESS OR IMPLIED WARRANTIES, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. IN NO EVENT SHALL THE AUTHOR OR CONTRIBUTORS BE LIABLE FOR ANY DIRECT, INDIRECT, INCIDENTAL, SPECIAL, EXEMPLARY, OR CONSEQUENTIAL DAMAGES (INCLUDING, BUT NOT LIMITED TO, PROCUREMENT OF SUBSTITUTE GOODS OR SERVICES; LOSS OF USE, DATA, OR PROFITS; OR BUSINESS INTERRUPTION) HOWEVER CAUSED AND ON ANY THEORY OF LIABILITY, WHETHER IN CONTRACT, STRICT LIABILITY, OR TORT (INCLUDING NEGLIGENCE OR OTHERWISE) ARISING IN ANY WAY OUT OF THE USE OF THIS SOFTWARE, EVEN IF ADVISED OF THE POSSIBILITY OF SUCH DAMAGE.

=== LINUX LICENSE =====

The linux operating system binary is licensed under the terms of the GNU GENERAL PUBLIC LICENSE, which is reproduced below. In accordance with section 3 of the GPL V2, source code to which this licence applies may be obtained from support@cedaraudio.com.

=== BUSYBOX LICENSE =====

The busybox binary is licensed under the terms of the GNU GENERAL PUBLIC LICENSE, which is reproduced below. In accordance with section 3 of the GPL V2, source code to which this licence applies may be obtained from support@cedaraudio.com.

=== GNU GENERAL PUBLIC LICENSE V2 =====

GNU GENERAL PUBLIC LICENSE Version 2, June 1991

Copyright (C) 1989, 1991 Free Software Foundation, Inc., 51 Franklin Street, Fifth Floor, Boston, MA 02110-1301 USA

Everyone is permitted to copy and distribute verbatim copies of this license document, but changing it is not allowed.

Preamble

The licenses for most software are designed to take away your freedom to share and change it. By contrast, the GNU General Public License is intended to guarantee your freedom to share and change free software--to make sure the software is free for all its users. This General Public License applies to most of the Free Software Foundation's software and to any other program whose authors commit to using it. (Some other Free Software Foundation software is covered by the GNU Lesser General Public License instead.) You can apply it to your programs, too.

When we speak of free software, we are referring to freedom, not price. Our General Public Licenses are designed to make sure that you have the freedom to distribute copies of free software (and charge for this service if you wish), that you receive source code or can get it if you want it, that you can change the software or use pieces of it in new free programs; and that you know you can do these things.

To protect your rights, we need to make restrictions that forbid anyone to deny you these rights or to ask you to surrender

the rights. These restrictions translate to certain responsibilities for you if you distribute copies of the software, or if you modify it.

For example, if you distribute copies of such a program, whether gratis or for a fee, you must give the recipients all the rights that you have. You must make sure that they, too, receive or can get the source code. And you must show them these terms so they know their rights.

We protect your rights with two steps: (1) copyright the software, and (2) offer you this license which gives you legal permission to copy, distribute and/or modify the software.

Also, for each author's protection and ours, we want to make certain that everyone understands that there is no warranty for this free software. If the software is modified by someone else and passed on, we want its recipients to know that what they have is not the original, so that any problems introduced by others will not reflect on the original authors' reputations.

Finally, any free program is threatened constantly by software patents. We wish to avoid the danger that redistributors of a free program will individually obtain patent licenses, in effect making the program proprietary. To prevent this, we have made it clear that any patent must be licensed for everyone's free use or not licensed at all.

The precise terms and conditions for copying, distribution and modification follow.

#### GNU GENERAL PUBLIC LICENSE - TERMS AND CONDITIONS FOR COPYING, DISTRIBUTION AND MODIFICATION

0. This License applies to any program or other work which contains a notice placed by the copyright holder saying it may be distributed under the terms of this General Public License. The "Program", below, refers to any such program or work, and a "work based on the Program" means either the Program or any derivative work under copyright law: that is to say, a work containing the Program or a portion of it, either verbatim or with modifications and/or translated into another language. (Hereinafter, translation is included without limitation in the term "modification".) Each licensee is addressed as "you".

Activities other than copying, distribution and modification are not covered by this License; they are outside its scope. The act of running the Program is not restricted, and the output from the Program is covered only if its contents constitute a work based on the Program (independent of having been made by running the Program). Whether that is true depends on what the Program does.

1. You may copy and distribute verbatim copies of the Program's source code as you receive it, in any medium, provided that you conspicuously and appropriately publish on each copy an appropriate copyright notice and disclaimer of warranty; keep intact all the notices that refer to this License and to the absence of any warranty; and give any other recipients of the Program a copy of this License along with the Program.

You may charge a fee for the physical act of transferring a copy, and you may at your option offer warranty protection in exchange for a fee.

2. You may modify your copy or copies of the Program or any portion of it, thus forming a work based on the Program, and copy and distribute such modifications or work under the terms of Section 1 above, provided that you also meet all of these conditions:

- a) You must cause the modified files to carry prominent notices stating that you changed the files and the date of any change.
- b) You must cause any work that you distribute or publish, that in whole or in part contains or is derived from the Program or any part thereof, to be licensed as a whole at no charge to all third parties under the terms of this License.
- c) If the modified program normally reads commands interactively when run, you must cause it, when started running for such interactive use in the most ordinary way, to print or display an announcement including an appropriate copyright notice and a notice that there is no warranty (or else, saying that you provide a warranty) and that users may redistribute the program under these conditions, and telling the user how to view a copy of this License. (Exception: if the Program itself is interactive but does not normally print such an announcement, your work based on the Program is not required to print an announcement.)

These requirements apply to the modified work as a whole. If identifiable sections of that work are not derived from the Program, and can be reasonably considered independent and separate works in themselves, then this License, and its terms, do not apply to those sections when you distribute them as separate works. But when you distribute the same sections as part of a whole which is a work based on the Program, the distribution of the whole must be on the terms of this License, whose permissions for other licensees extend to the entire whole, and thus to each and every part regardless of who wrote it.

Thus, it is not the intent of this section to claim rights or contest your rights to work written entirely by you; rather, the intent is to exercise the right to control the distribution of derivative or collective works based on the Program.

In addition, mere aggregation of another work not based on the Program with the Program (or with a work based on the Program) on a volume of a storage or distribution medium does not bring the other work under the scope of this License.

3. You may copy and distribute the Program (or a work based on it, under Section 2) in object code or executable form under the terms of

Sections 1 and 2 above provided that you also do one of the following:

- a) Accompany it with the complete corresponding machine-readable source code, which must be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange; or,
- b) Accompany it with a written offer, valid for at least three years, to give any third party, for a charge no more than your cost of physically performing source distribution, a complete machine-readable copy of the corresponding source code, to be distributed under the terms of Sections 1 and 2 above on a medium customarily used for software interchange; or,
- c) Accompany it with the information you received as to the offer to distribute corresponding source code. (This alternative is allowed only for noncommercial distribution and only if you received the program in object code or executable form with such an offer, in accord with Subsection b above.)

The source code for a work means the preferred form of the work for making modifications to it. For an executable work, complete source code means all the source code for all modules it contains, plus any associated interface definition files, plus the scripts used to control compilation and installation of the executable. However, as a special exception, the source code distributed need not include anything that is normally distributed (in either source or binary form) with the major components (compiler, kernel, and so on) of the operating system on which the executable runs, unless that component itself accompanies the executable.

If distribution of executable or object code is made by offering access to copy from a designated place, then offering equivalent access to copy the source code from the same place counts as distribution of the source code, even though third parties are not compelled to copy the source along with the object code.

4. You may not copy, modify, sublicense, or distribute the Program except as expressly provided under this License. Any attempt otherwise to copy, modify, sublicense or distribute the Program is void, and will automatically terminate your rights under this License. However, parties who have received copies, or rights, from you under this License will not have their licenses terminated so long as such parties remain in full compliance.

5. You are not required to accept this License, since you have not signed it. However, nothing else grants you permission to modify or distribute the Program or its derivative works. These actions are prohibited by law if you do not accept this License. Therefore, by modifying or distributing the Program (or any work based on the Program), you indicate your acceptance of this License to do so, and all its terms and conditions for copying, distributing or modifying the Program or works based on it.

6. Each time you redistribute the Program (or any work based on the Program), the recipient automatically receives a license from the original licensor to copy, distribute or modify the Program subject to these terms and conditions. You may not impose any further restrictions on the recipients' exercise of the rights granted herein. You are not responsible for enforcing compliance by third parties to this License.

7. If, as a consequence of a court judgment or allegation of patent infringement or for any other reason (not limited to patent issues), conditions are imposed on you (whether by court order, agreement or otherwise) that contradict the conditions of this License, they do not excuse you from the conditions of this License. If you cannot distribute so as to satisfy simultaneously your obligations under this License and any other pertinent obligations, then as a consequence you may not distribute the Program at all. For example, if a patent license would not permit royalty-free redistribution of the Program by all those who receive copies directly or indirectly through you, then the only way you could satisfy both it and this License would be to refrain entirely from distribution of the Program.

If any portion of this section is held invalid or unenforceable under any particular circumstance, the balance of the section is intended to apply and the section as a whole is intended to apply in other circumstances.

It is not the purpose of this section to induce you to infringe any patents or other property right claims or to contest validity of any such claims; this section has the sole purpose of protecting the integrity of the free software distribution system, which is implemented by public license practices. Many people have made generous contributions to the wide range of software distributed through that system in reliance on consistent application of that system; it is up to the author/donor to decide if he or she is willing to distribute software through any other system and a licensee cannot impose that choice.

This section is intended to make thoroughly clear what is believed to be a consequence of the rest of this License.

8. If the distribution and/or use of the Program is restricted in certain countries either by patents or by copyrighted interfaces, the original copyright holder who places the Program under this License may add an explicit geographical distribution limitation excluding those countries, so that distribution is permitted only in or among countries not thus excluded. In such case, this License incorporates the limitation as if written in the body of this License.

9. The Free Software Foundation may publish revised and/or new versions of the General Public License from time to time. Such new versions will be similar in spirit to the present version, but may differ in detail to address new problems or concerns.

Each version is given a distinguishing version number. If the Program specifies a version number of this License which applies to it and "any later version", you have the option of following the terms and conditions either of that version or of any later version published by the Free Software Foundation. If the Program does not specify a version number of this License, you may choose any version ever published by the Free Software Foundation.

10. If you wish to incorporate parts of the Program into other free programs whose distribution conditions are different, write to the author to ask for permission. For software which is copyrighted by the Free Software Foundation, write to the Free Software Foundation; we sometimes make exceptions for this. Our decision will be guided by the two goals of preserving the free status of all derivatives of our free software and of promoting the sharing and reuse of software generally.

#### NO WARRANTY

11. BECAUSE THE PROGRAM IS LICENSED FREE OF CHARGE, THERE IS NO WARRANTY FOR THE PROGRAM, TO THE EXTENT PERMITTED BY APPLICABLE LAW. EXCEPT WHEN OTHERWISE STATED IN WRITING THE COPYRIGHT HOLDERS AND/OR OTHER PARTIES PROVIDE THE PROGRAM "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE. THE ENTIRE RISK AS TO THE QUALITY AND PERFORMANCE OF THE PROGRAM IS WITH YOU. SHOULD THE PROGRAM PROVE DEFECTIVE, YOU ASSUME THE COST OF ALL NECESSARY SERVICING, REPAIR OR CORRECTION.

12. IN NO EVENT UNLESS REQUIRED BY APPLICABLE LAW OR AGREED TO IN WRITING WILL ANY COPYRIGHT HOLDER, OR ANY OTHER PARTY WHO MAY MODIFY AND/OR REDISTRIBUTE THE PROGRAM AS PERMITTED ABOVE, BE LIABLE TO YOU FOR DAMAGES, INCLUDING ANY GENERAL, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES ARISING OUT OF THE USE OR INABILITY TO USE THE PROGRAM (INCLUDING BUT NOT LIMITED TO LOSS OF DATA OR DATA BEING RENDERED INACCURATE OR LOSSES SUSTAINED BY YOU OR THIRD PARTIES OR A FAILURE OF THE PROGRAM TO OPERATE WITH ANY OTHER PROGRAMS), EVEN IF SUCH HOLDER OR OTHER PARTY HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES.

END OF TERMS AND CONDITIONS

# LICENCE AND LIMITED WARRANTY

## 1. DEFINITIONS

In this Licence and Limited Warranty the following words and phrases shall bear the following meanings:

- 'the Company' is CEDAR Audio Limited of 20 Home End, Fulbourn, Cambridge CB21 5BS, UK;
- 'a/the System' means an instance of the DNS 8D sound processing system comprising hardware and software developed by the Company;
- 'this Document' means this Licence and Limited Warranty.

## 2. ISSUE AND USE OF THE SYSTEM

- 2.1 The terms and conditions of this Document are implicitly accepted by any person or body corporate who shall at any time use or have access to the System, and are effective from the date of supply of the System by CEDAR Audio Limited to its immediate customer.
- 2.2 The Company hereby grants to the Licensee and the Licensee agrees to accept a non-exclusive right to use the System.

## 3. PROPERTY AND CONFIDENTIALITY

- 3.1 The System contains confidential information of the Company and all copyright, trade marks, trade names, styles and logos and (excluding such IP owned by Audinate or covered by the attached 3rd-party licences or is in the public domain) all other intellectual property rights in the System and the documentation and manuals relating thereto are the exclusive property of the Company. The Licensee acknowledges that all such rights are the property of their respective owners and shall not question or dispute the ownership of any such rights nor use or adopt any trading name or style similar to that of the Company or any other relevant parties.
- 3.2 Unless explicitly permitted in writing by the relevant intellectual property owner, the Licensee shall not attempt to reverse engineer, modify, copy, merge or transcribe the whole or any part of the System or any information or documentation relating thereto.
- 3.3 The Licensee shall take all reasonable steps to protect the confidential information and intellectual property rights of the Company and other owners of intellectual property in the System.

## 4. LIMITED WARRANTY AND POST-WARRANTY OBLIGATIONS

- 4.1 The Company warrants that a System will perform substantially in accordance with the appropriate section of its accompanying product manual for a period of one year from the date of supply to the Company's immediate customer.
- 4.2 The Company will make good at its own expenses by repair or replacement any defect or failure that develops in a System within one year of supply to the Company's immediate customer.
- 4.3 The Company shall have no liability to remedy any defect, failure, error or malfunction that arises as a result of any improper use, operation or neglect of a System, or any attempt to repair or modify a System by any person other than the Company or a person appointed with the Company's prior written consent.
- 4.4 In the case of any defect or failure in a System occurring more than twelve months after its supply to the Company's immediate customer the Company will at its option and for a reasonable fee make good such defect or failure by repair or replacement (at the option of the Company) subject to the faulty equipment having first been returned to the Company. The Company will use reasonable efforts to return repaired or replacement items promptly, all shipping, handling and insurance costs being for the account of the Licensee.
- 4.5 The above undertakings 4.1 to 4.4 are accepted by the Licensee in lieu of any other legal remedy in respect of any defect or failure occurring during the said period and of any other obligations or warranties expressed or implied including but not limited to the implied warranties of saleability and fitness for a specific purpose.
- 4.6 The Licensee hereby acknowledges and accepts that nothing in this Document shall impose upon the Company any obligation to repair or replace any item after a time when it is no longer produced or offered for supply by the Company or which the Company certifies has been superseded by a later version or has become obsolete.

## **5. FORCE MAJEURE**

The Company shall not be liable for any breach of its obligations hereunder resulting from causes beyond its reasonable control including, but not limited to, fires, strikes (of its own or other employees), insurrection or riots, embargoes, container shortages, wrecks or delays in transportation, inability to obtain supplies and raw materials, or requirements or regulations of any civil or military authority.

## **6. WAIVER**

The waiver by either party of a breach of the provisions hereof by the other shall not be construed as a waiver of any succeeding breach of the same or other provisions, nor shall any delay or omission on the part of either party to exercise any right that it may have under this Licence operate as a waiver of any breach or default by the other party.

## **7. NOTICES**

Any notices or instruction to be given hereunder shall be sent by first-class post or email to the other party, and shall be deemed to have been served upon the expiration of seven days after posting or (if sent electronically) upon the expiration of twelve hours after transmission.

## **8. ASSIGNMENT AND SUB-LICENSING**

The Licensee may at his discretion assign a System and in doing so shall assign this License its rights and obligations to the purchaser who shall without reservation agree to be bound by this License. The original Licensee and any subsequent Licensees shall be bound by the obligations of this License in perpetuity.

## **9. LIMITATION OF LIABILITY**

The Company's maximum liability under any claim including any claim in respect of infringement of the intellectual property rights of any third party shall be, at the option of the Company either:

- (a) return of a sum calculated as the price received for the System by the Company from its immediate customer depreciated on a straight line basis over a one year write-off period; or
- (b) repair or replacement of those components of the System that do not meet the warranties contained within this Document.

The foregoing states the entire liability of the Company to the Licensee.

## **10. CONSEQUENTIAL LOSS**

Even if the Company has been advised of the possibility of such damages, and notwithstanding anything else contained herein the Company shall under no event be liable to the Licensee or to any other persons for loss of profits or contracts or damage (whether direct or consequential) arising in connection with a System or any modification, variation or enhancement thereof and including any documentation or data provided by the Company or for any other indirect or consequential loss.

## **11. ENTIRE AGREEMENT**

The Company shall not be liable to the Licensee for any loss arising in connection with any representations, agreements, statements or undertakings made prior to the date of supply of the System to the Licensee.

## **12. TERMINATION**

This Licence may be terminated forthwith by the Company if the Licensee commits any material breach of any terms of this License. Forthwith upon such termination the Company shall have immediate right of access to the System for the purpose of removing it.

## **13. SEVERABILITY**

Notwithstanding that the whole or any part of any provision of this Document may prove to be illegal or unenforceable the other provisions of this Document and the remainder of the provision in question shall remain in full force and effect.

## **14. HEADINGS**

The headings to the Clauses are for ease of reference only and shall not affect the interpretation or construction of this Document.

## **15. LAW**

This Document shall be governed by and construed in accordance with English law and all disputes between the parties shall be determined in England in accordance with the Arbitration Act 1950 and 1979.

# CEDAR

## DNS 8D

Inspected:	
QC Engineer:	
Serial number:	

Designed and manufactured by

CEDAR Audio Ltd  
20 Home End  
Fulbourn  
Cambridge CB21 5BS  
United Kingdom

[www.cedaraudio.com](http://www.cedaraudio.com)  
[info@cedaraudio.com](mailto:info@cedaraudio.com)  
t: +44 1223 881771

Copyright CEDAR Audio Ltd, © 2019 - 2020

CEDAR is a registered trademark of CEDAR Audio Ltd

DNS, DNS One, DNS 8D, DNS 8 Live, DNS 8 CS, DNS One, DNS Two, DNS 2, DNS1000, DNS1500, DNS2000 and DNS3000 are trademarks of CEDAR Audio Ltd

E&OE, Subject to revision at the Company's sole discretion