

DNS One

Dialogue Noise Suppressor



CEDAR 

CEDAR Audio Limited
www.cedaraudio.com

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INTRODUCTION

In 2000, CEDAR Audio launched the DNS1000 dynamic noise suppressor. This was a stand-alone, desktop-format unit designed specifically for film production, dubbing, outside broadcast (remote) and studio noise suppression.

The hardware format of the DNS1000 and its successor, the DNS1500, is ideal for replacing analogue units that have been in use for many years, and for use in situations where rapid setup and processing are required 'on the fly'. However, they do not offer automation, nor can they be connected to a digital audio workstation other than by their audio connectors. So we designed the DNS2000 and DNS3000, which combine versions of the DNS hardware with an RTAS plug-in that provides remote control and automation capabilities.

The latest addition to the family is the DNS One, which comprises the DNS Control System (an RTAS and AudioSuite plug-in that – when used in real-time - is compatible with the DNS2000 and DNS3000) and a DNS processing engine that runs in software on the host Mac or PC. Very simple and quick to install, the Control System allows you to control all aspects of the DNS One's operation from within Pro Tools, and to automate all its operating parameters. Quality, speed and simplicity are paramount considerations in the DNS One design, and its features include the following:

Compatibility

It can be used with both Pro Tools (Mac) and Pro Tools (PC) systems.

Flexibility

It will handle a wide range of noise suppression requirements.

Speed and ease of use

It offers a carefully designed user-interface that maximises speed of use.

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COMPONENTS

Your DNS One package should contain the following components:

- software CD-ROM
- USB dongle
- warranty registration card

ASSUMED KNOWLEDGE

DNS One should be used with Pro Tools version 7.4 or later running on a Mac or PC.

This manual assumes that you are fully conversant with your Mac or PC system(s), and that you know how to operate Pro Tools. It will refer to operations that are common to these products, but will not attempt to explain them.

Troubleshooting Non-CEDAR Components

If you encounter problems with your Macintosh®, OSX®, your PC, Microsoft Windows®, or Pro Tools®, please refer to the relevant manuals, or contact the dealer that supplied these to you.

Unless appointed independently as authorised dealers for the following products, CEDAR Audio's dealers will not attempt to provide technical support for:

- Macintosh computers
- Mac OSX
- PCs of any description
- Microsoft Windows
- Digidesign hardware
- Digidesign software

CONTACT INFORMATION

Headquarters

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Web

English language:	www.cedaraudio.com
German language:	www.cedaraudio.de

Worldwide Dealer List

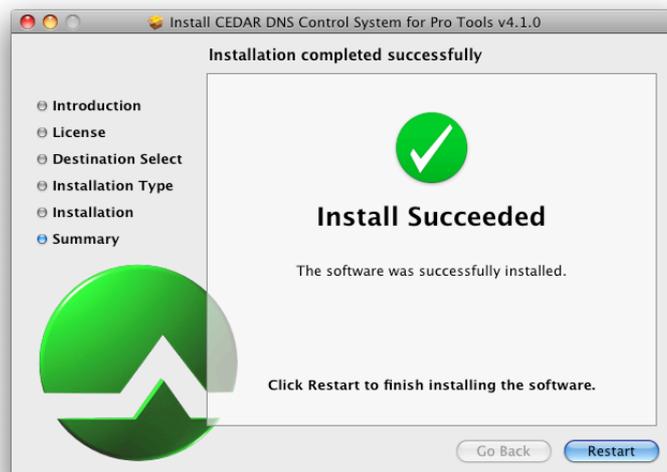
For an up-to-date dealer list, please visit www.cedaraudio.com, and click on 'Contact Us' followed by 'Worldwide Dealer List'.

INSTALLING DNS ONE – MAC

- Insert the CD.
- Ensure that any older versions of the plug-in (if any) are archived and removed from the plug-in folder.
- Double-click on the installer package:
DnsCsDistribution.pkg
- Follow the instructions offered by the installer.
- Ensure that you have sufficient space on your drive.



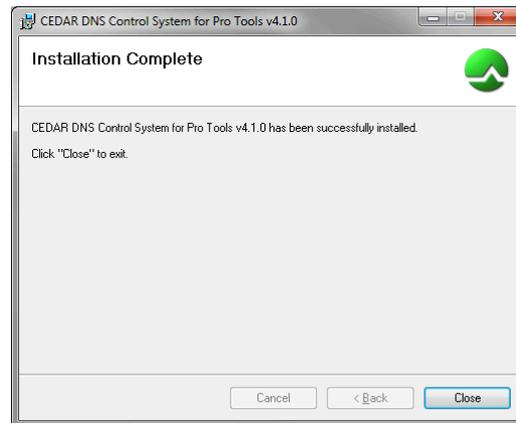
- Press the Continue button when prompted and the software will be installed. A message will appear to tell you that the operation has been completed successfully.



- Insert the DNS One dongle into any available USB socket, and DNS One is now ready for use.

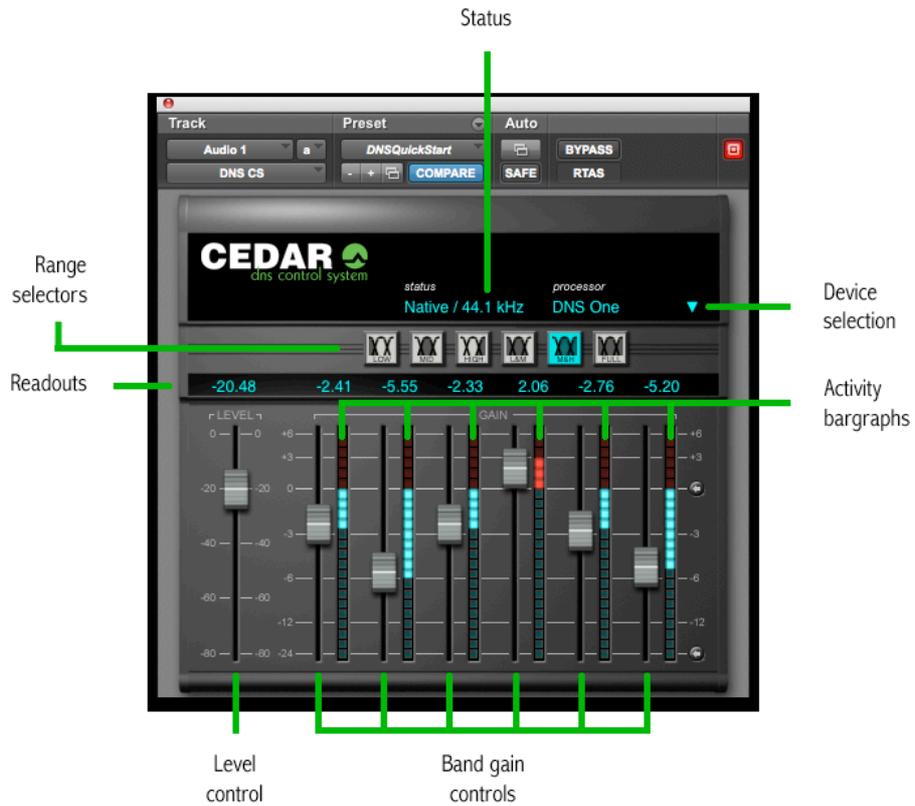
INSTALLING DNS ONE – PC

- Insert the CD.
- Double-click on the installer package:
setup.exe
- Follow the instructions offered by the installer.
- Press the Next button when prompted and the software will be installed. A message will appear to tell you that the operation has been completed successfully.



- When the installation is complete, click on Close.
- Insert the DNS One dongle into any available USB socket. The PC will identify the new hardware and, after a few moments, DNS One will be ready for use.

DNS CONTROL SYSTEM – CONTROLS



Range Selectors

The Range Selectors concentrate the unit’s activity into the desired part of the audio spectrum. Selecting any of these ranges concentrates all of the filters within the DNS One’s filter bank across that part of the audio spectrum.

Range	Frequencies covered
Low	20Hz - 400Hz
Mid	200Hz - 6kHz
High	4kHz - 18kHz
Low+Mid	20Hz - 6kHz
Mid+High	200Hz - 18kHz
Full Range	20Hz - 18kHz

Level Control

The Level Control tells the DNS One how much noise is present in the input.

Band Gain Controls

The DNS One divides a signal into a large number of well-defined bands. Sophisticated digital filters analyse each of these bands and suppress the noise independently in each. The innovative design of this filter bank allows you to adjust the DNS One using relatively few controls.

The Band gain controls determine the maximum amount of processing that the DNS One will apply in each band.

Activity Bargraphs

These offer a visual indication of the activity in each of the bands.

Device Selection

You can connect the DNS Control System in its RTAS form to any of the following three CEDAR products:

- DNS One
- DNS2000
- DNS3000

The drop-down list on the plug-in displays all the DNS processors that are currently available, and it allows you to select which processing engine will be controlled by this instance of the DNS Control System.

To use the version of DNS One installed on your system, select **DNS One**.

The DNS Network Scanner

If you have DNS3000s on the same network as the Pro Tools system running DNS One, you can use the Scan Network option to detect and register these for local use.

Status

If no processing engine is connected and/or selected, the I/O status will read **No processor**.

If the DNS Control System has successfully connected to the DNS One processing engine the following status messages may occur:

Message	Explanation
Native / xx.x kHz	DNS One is licensed and working correctly.
Expires xx days	This message is shown when a demonstration licence is nearing its expiry.
Demo expired	A demonstration licence has been used and has expired.
Unlicensed	The dongle does not contain a licence for DNS One.
HSP-2 detached	The dongle was removed while DNS One was running – please reinsert.

If the DNS Control System has not connected successfully with the DNS One processing engine the following status messages may occur:

Message	Explanation
DNS One missing	The DNS One file is missing or corrupt. Close Pro Tools, then reinstall DNS One and restart Pro Tools.
No HSP-2 detected	No dongle was connected when attempting to load DNS One from drop down menu. Insert the dongle and restart Pro Tools.
CPU not supported	The host computer does not support DNS One. You will need to use a more modern system.

Generic Pro Tools Plug-in Controls

The standard Pro Tools plug-in facilities are provided. These have generic operation, and are described in the Pro Tools documentation.

Automation

The Band Gain settings, the Level and the Range Selectors appear in the Plug-In Automation screen and, together with the Pro Tools bypass control, may be automated in standard Pro Tools fashion.

TUTORIALS

Launch the DNS Control System in its RTAS or AudioSuite form as required.

Selecting a Processor (RTAS only)

You can launch the DNS Control System (DNS CS) on your Pro Tools system, but until you tell it which processor to use, it will do nothing.

The drop-down list on the DNS Control System displays the DNS One plus all other available processors connected to your system.

Range Selector

With the DNS One processor selected, you should identify the frequency range or ranges in which the unwanted noise lies, and select any of six possible processing ranges by clicking on the appropriate buttons.

With practice, you will be able to identify the range by ear. Until then, you may prefer to use the methods described in the following case studies.

Level Control

Your next job will be to identify the noise level of the audio. With the appropriate range selected, pull all six Band Gain controls and the Level control down fully or use the **DNSQuickStart** preset to do so. Now increase the Level slowly. At first, you will hear very little happen but, at some point determined by the noise content of the recording, you will hear the noise disappear. You should attempt to determine the point at which this occurs.

When the Band Gain controls are fully down, maximum processing occurs for any given Level setting, thus making identification of the noise easier.

Band Gain Controls

Once you have chosen the Range and determined the Level, you control the action of the DNS One's filter bank using the Band Gain controls.

The six faders represent six frequency bands (each containing multiple filters) distributed from lower frequencies (left) to higher frequencies (right) across the selected range.

You will use the Band Gain controls to control the amount of noise attenuation performed in each band, adjusting them to suppress as much noise as possible without introducing unwanted artefacts into the desired signal.

Noise suppression occurs in a given band when the fader is below 0dB. However, there are occasions when you might wish to boost the signal in a given band, and you can do this by moving the appropriate fader above 0dB.

You can move all the Band Gain controls to 0dB or to -24dB by pressing the appropriate reset arrow to the right of the faders themselves.

Case studies

The following three examples illustrate ways to use the DNS One. They may not be the ways that you choose to operate it for all jobs, but they will get you started.

Case 1: Suppressing traffic noise and other ambient sound

The DNS One can suppress background noises such as road traffic, aircraft, air conditioning, wind, rain, and many other common soundstage, location, and outside broadcast (remote) problems that contaminate audio. If your signal exhibits any of these problems, you can suppress them as follows.

First, identify the frequency range(s) in which the noise lies.

You should be able to do this by listening to the problem. However, if this proves difficult, you can use the following method.

It is not important that you find the perfect settings at the first attempt. In particular, you will be able to refine your Level and Band Gain settings once you have found the correct range.

Begin as follows:

Ensure that the DNS One is not in Bypass

Select Full Range

- Set all six Band Gain controls to -24dB
- Move the Level control to -80 and then raise it until the noise disappears

At this point you have determined an approximate setting for the Level. This is necessary for determining the range but it is likely that you will refine this later in the procedure.

When the Level is close to the ideal setting, you should see the Activity Bargraphs in the Control System flicker in response to the signal content.

Now continue as follows:

- Raise the Band Gain controls to 0dB (no processing occurs)
- Adjust the Band Gain controls to suppress the noise

You should always attempt to suppress the noise with the minimum of damage to the desired signal.

In all likelihood, you will find that the leftmost Band Gain controls are pulled down significantly, whereas the central and rightmost are close to 0dB. This tells you that the problem does not lie in the upper frequencies, so you should use the Range Selectors to select Low+Mid. Then repeat the steps marked '•'.

If you now find that you are using all six faders in similar fashion, it is likely that the noise is distributed across the entire Low+Mid range. However, if the suppression is still heavily biased towards the left-hand faders, you should now select the Low range and repeat the procedure.

If you select Low alone and cannot suppress the noise, it is probable that there is considerable noise energy in the Mid band, so you should return to using Low+Mid ranges.

For many problems such as traffic noise, the noise will lie primarily in the range 50Hz - 1.5kHz. In this case, Low+Mid will be the correct choice.

Second, optimise the Level control.

Listening carefully to the audio, refine the Level setting so that the noise is correctly identified without introducing audible artefacts. If this proves difficult, you can return the Band Gain controls to -24dB for this stage.

The DNS One takes a short period to settle after moving the Level control (especially in the lower ranges) so you should not adjust it rapidly.

Third, refine the Band Gain controls for optimum suppression.

Set all six Band Gain controls to 0dB. Now increase and decrease the gain in each band separately while listening to the effect that each has on the noise. This will identify the bands that contain the majority of the noise. (Do not be alarmed if all six bands contain significant noise. This is not unusual.)

Let's assume that the greatest improvement occurs when you reduce the gain in bands 3 and 4. This suggests that the noise is concentrated in an approximate range of 200Hz to 1kHz. You should now find the optimum positions for all six faders. The greatest cuts will lie in bands 3 and 4, whereas bands 1, 2, 5 and 6 should remain as close to 0dB as possible to ensure that minimal signal damage occurs in the bands that do not contain much noise.

The final configuration might look like this:



Case 2: Suppressing tape hiss

DNS One can suppress the tape hiss that mars many older recordings. It will also improve the signal/noise ratio of dialogue tapes that have been poorly copied as well as those that are several generations old.

First, identify the frequency range(s) in which the noise lies.

You should follow the procedure laid down in the previous example to determine the range(s) in which the problem lies. For most instances of tape hiss, you will find that the Mid+High ranges are most appropriate. In a few cases you may find that the High range alone is most suitable.

It is not as common to require suppression in the Low range because hiss is usually less prominent at lower frequencies, and it may also be masked by the genuine audio in the range.

Second, optimise the Level control.

To determine the correct Level, you should again follow the procedure described previously.

Third, refine the Band Gain controls for optimum suppression.

As in the first tutorial example, you should start with all six Band Gain controls at 0dB. You should then increase and decrease each control individually to find the bands that contribute most hiss to the signal. Because tape hiss often exhibits a white profile at Mid and High frequencies, you may find that satisfactory results are achieved with the Band Gain controls set in a horizontal line.

However, hiss is generally less annoying at very high audio frequencies. Consequently, you may be able to reduce the amount of processing in the uppermost bands. This will help to ensure that any low amplitude signal components lying at high frequencies (which provide much of the 'air', 'ambience' or 'life' in a signal) are passed with little or no attenuation.

The final configuration might look like this:



Case 3: Suppressing excessive reverberation

In many situations, the DNS One can suppress excessive reverberation. This can be useful in TV production when you need to match the audio from a large recording studio or soundstage to visual images set in a small room or other enclosed space. Suppressing reverberation can also be beneficial in increasing the intelligibility of poor dialogue recordings.

The method used to suppress reverberation is quite different from that applied in the previous examples, and is as follows:

First, set the range in which the reverberation lies.

In general, reverberant spaces include soft materials that absorb high frequencies more rapidly than middle and lower frequencies. Even bare rooms with hard walls include these soft materials: they are the people who are speaking.

Consequently, you will find that Low+Mid is almost always the most appropriate combination of ranges for suppressing reverberation.

Second, set the Band Gain controls.

You should set all six Band Gain controls to -24dB. This will ensure that (if the Level is set correctly) DNS One applies maximum suppression to the tails of the sound.

Third, optimise the Level control.

Starting at its minimum position (-80dB) increase the Level control slowly. At some point before full noise suppression becomes apparent, you will hear the tails of louder sounds become truncated.

You can adjust the amount of truncation of the reverb using the Level control rather than the Band Gain controls.

The final configuration might look like this:



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TECHNICAL SUPPORT

Should you experience difficulties with your CEDAR DNS One, please contact your local dealer or CEDAR office. Alternatively, you may send an email to support@cedaraudio.com. In either case, please provide the following details:

- Your dongle serial number and software version number.
- Details of the host system and version numbers.
- A precise description of the problem.

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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;

'the System' means any instance of the DNS One and DNS Control System software systems developed by the Company;

'this Document' means this Licence and Limited Warranty.

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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.

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4.1 The Company warrants that the 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 customers.

4.2 The Company will make good at its own expenses by repair or replacement any defect or failure that develops in the 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 the System, or any attempt to repair or modify the System by any person other than the Company or a person appointed with the Company's prior written consent.

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6. WAIVER

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7. NOTICES

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

8. ASSIGNMENT AND SUB-LICENSING

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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.

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

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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.

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