

CEDAR

for Pro Tools

Macintosh USB versions
OS9.xx and OS-X



DNS2000 dialogue noise suppressor

OWNER'S MANUAL

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- pro audio with a smile



Table of Contents

Introduction	4
Host System Requirements	5
DNS2000 Firmware	5
Assumed Knowledge	5
Safety Instructions	6
Setting up the DNS2000	7
Unpacking	7
Installation Site	7
Rear Panel Connections	7
The Remote Control Software	8
Installation	8
Using the DNS2000 within Pro Tools	9
Software Controls	10
DNS2000 Specific Controls	10
Generic Pro Tools Plug-in Controls	11
Automation	11
Hardware Indicators	12
USB LEDs	12
Input LEDs	12
Off / On LEDs - Channel 1 & Channel 2	12
Range LEDs - Channel 1 & Channel 2	13
Gain LEDs - Channel 1 & Channel 2	13
Tutorial	14
Selecting a DNS2000 Processor	14
Range Selector	15
Level Control	15
Band Gain Controls	15
Case Studies	16
Suppressing traffic noise and other ambient sound	16
Suppressing tape hiss	18
Suppressing excessive reverberation	19
Troubleshooting Non-CEDAR Components	20
Specifications	21
General	21
Audio	21
EMC Regulations	21
Declaration of conformity	21
License and Limited Warranty	22

INTRODUCTION

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

The format of the DNS1000 is ideal for replacing analogue units that have been in use for many years, and for use in situations where rapid setup and processing is required 'on the fly'. However, it does not offer automation, nor can it be linked to a digital audio workstation other than by its audio connectors. So we designed the DNS2000...

The DNS2000 is a combination of a rackmount unit that provides audio I/O and nearly 200MFLOPS of processing power, plus remote control software for your Pro Tools host system. With just a single USB control connection between the DNS2000 hardware and the host, the DNS2000 is very simple and quick to install.

Once you have loaded the DNS2000 remote control software, you can control all aspects of the DNS2000 from within Pro Tools, and automate all its operating parameters. Quality, speed and simplicity are paramount considerations in the DNS2000 design, and its features include the following:

n Near zero latency

The DNS2000 has a group delay of less than 10 samples (typically less than 1/200th of a frame) so there is no loss of lip-sync when using it.

n Flexibility

The DNS2000 will handle a wide range of noise suppression requirements.

n Speed and ease of use

The DNS2000 offers a carefully designed user-interface that maximises speed of use.

n Audio interfaces

The DNS2000 incorporates a 24-bit digital audio interface conforming to both AES/EBU and SPDIF standards.

n Universal power supply

Its universal power supply means that a DNS2000 will work anywhere in the world.

n Powerful processor

A 40-bit floating point DSP processor delivers up to 198MFLOPS so that the DNS2000 will handle the most complex processing requirements.

HOST SYSTEM REQUIREMENTS

Macintosh OS-X users:

The DNS2000 should be used with Pro Tools version 6 or later. Any Macintosh with a free USB port running Mac OS-X and a suitable version of Pro Tools will support the OS-X version of the DNS2000 Remote Control Software and processor unit.

Macintosh OS9.xx users:

We recommend that the DNS2000 should be used with Pro Tools version 5.1.1 or later. Any Macintosh with a free USB port running Mac OS 9.xx and a suitable version of Pro Tools will support the OS9 version of the DNS2000 Remote Control Software and processor unit.

DNS2000 FIRMWARE

If you intend to use the DNS2000 with a Macintosh running OS-X, the DNS2000 hardware will require version 2 firmware. This is supplied as standard with all units shipped on or after 1 September 2003. Units originally shipped for use under OS9.xx and which incorporate version 1 firmware must be upgraded to version 2. The upgrade software is provided on your DNS2000 installation CD as:

OS 10:Firmware Upgrade:DNS2000 Firmware Upgrade.command

Double-click to run this programme, and follow the on-screen instructions.

If the DNS2000 hardware already has version 2 firmware installed, the programme will return an error message informing you that there is no need to upgrade.

ASSUMED KNOWLEDGE

This manual assumes that you are fully conversant with your Macintosh computer and MacOS, and that you know how to operate your Pro Tools host system. It will refer to operations that are common to these products, but will not attempt to explain them.

SAFETY INSTRUCTIONS

Read these instructions, and follow them.

n Water and moisture

The DNS2000 rackmount processor must not be exposed to rain or moisture. Furthermore, if the DNS2000 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 DNS2000, and even cause danger to life. Always allow the DNS2000 to reach ambient temperatures naturally before connecting the mains power.

n Mounting and ventilation

You should place the DNS2000 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 DNS2000 to strong sunlight, excessive dust, mechanical vibration or periodic shocks. The unit 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.

n Power sources

The DNS2000 features a universal power supply that will work safely on any mains supply in the range 85V to 260V, 50Hz or 60Hz AC only. The unit should always be grounded (earthed), and you should route power cables so that they will not be walked on or pinched.

n Connections

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

n Cleaning

Clean the DNS2000 only with a dry cloth. Never use abrasive pads or liquid cleaners such as alcohol or benzene.

n Damage requiring service

The DNS2000 contains no user-serviceable parts and should on no account be opened or dismantled by unauthorised personnel. It 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 DNS2000

Unpacking

Unpack the DNS2000 carefully. Save the carton and all packing materials since you may need them to transport the unit in the future. In addition to this manual, the DNS2000 and its packaging, the box should contain the following:

- mains connection lead and USB cable
- software CD-ROM
- rackmounting accessories and rubber feet
- warranty registration card.

Installation Site

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.



Rear Panel Connections

Audio Connections

The DNS2000 offers two audio connection standards. It passes its signal to both outputs irrespective of the input used. The standards are:

- Digital SPDIF format
- Digital AES/EBU format

Note: The processor will lock onto the first input that provides a valid clock.

The DNS2000 is not affected by channel status data. It will echo any such data directly to the outputs.

THE REMOTE CONTROL SOFTWARE

Installation

Follow these instructions to load and set up your DNS2000 Remote Control Software:

OS9.xx users:

- Insert the CD
- Copy the file named **CEDARDNS2000Driver** from the CD to your **Extensions** folder. You can do this by dragging and dropping the file directly into the folder, or by dropping it onto the MacOS System Folder, whereupon the operating system will place it in the correct folder
- Copy the file **CEDARDNS2000Shim** from the CD to your **Extensions** folder
- Copy the file **CEDARDNS2000.PPC** from the CD to the **Plug-Ins** folder. You will probably find this at the following location on your hard disk:

Macintosh HD:System Folder:DAE Folder:Plug-Ins

It is not necessary to restart your Macintosh after transferring these files if you are loading the DNS2000 Remote Control Software for the first time. However, you will need to perform a restart after loading a new version of the Remote Control Software. This is because the earlier file **CEDARDNS2000Shim** will remain in memory until replaced at start-up.

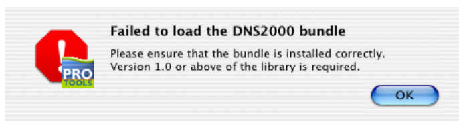
OS-X users:

- Insert the CD
- Double-click on the **DNS2000BundleInstaller.pkg** icon
- Follow the on-screen instructions and, if prompted to do so, install the library on the same volume as your Pro Tools installation
- Copy the file **CEDARDNS2000RCS** to the Pro Tools plug-ins folder:

Macintosh HD:Applications:Digidesign:Protools:Plug-ins alias

It is not necessary to restart your Macintosh after transferring these files, but installation should not take place while Pro Tools is running.

If you receive the following error message when attempting to run the DNS2000, you should check that you have installed the software correctly.



Note: In both cases, there are two versions of the DNS2000 Remote Control Software now installed on your Pro Tools system. The first operates as a mono process. You select this from the plug-in menu in the Pro Tools mixer. The second operates as a stereo process, and applies the same settings to both channels in a stereo track. You select this from the multi-channel plug-in menu in the mixer.

Using the DNS2000 within Pro Tools

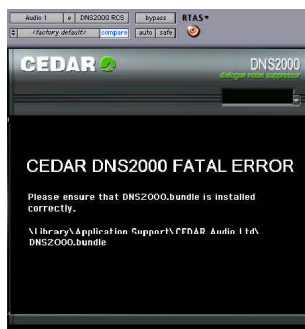
- n Ensure that the USB cable is connected between the Pro Tools system and the CEDAR DNS2000 processor unit. If the connection is successful, the USB 'link' LED on the processor unit front panel will light.
- n Launch a Pro Tools session.
- n Insert **DNS2000 RCS (mono)** or **DNS2000 RCS (stereo)** as a plug-in.

Note: If the DNS2000 Remote Control Software plug-ins do not appear in the list of available processes it is possible that you have copied the plug-in file to the wrong folder.

If you have loaded the software correctly and loaded the Remote Control Software into a suitable channel, you should now see the RCS screen. If an error screen appears please check the location(s) of the library, or driver and shim (as appropriate).



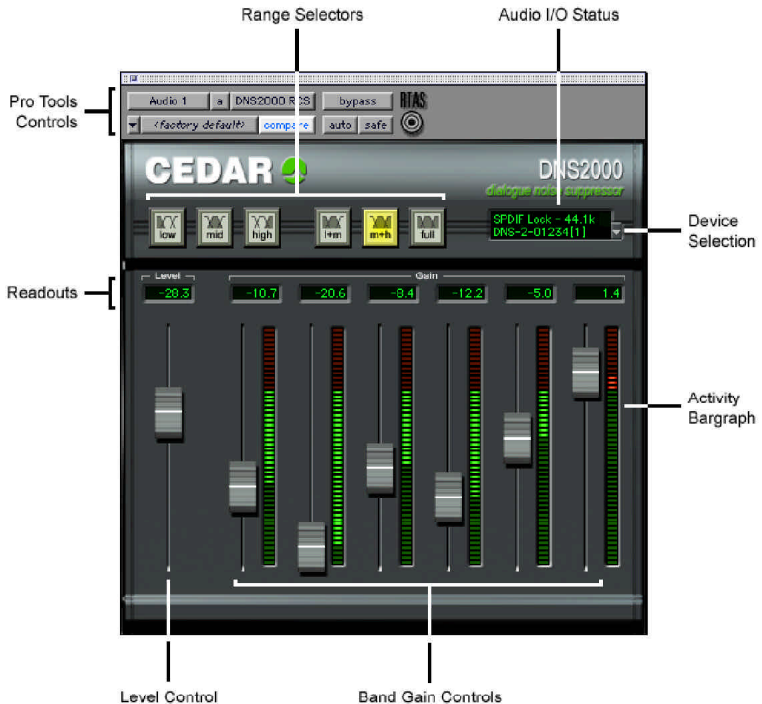
OS9.xx error screen



OS-X error screen

If you have attached the DNS2000 to the Pro Tools system using the USB cable, and if you have correctly connected the audio signal leads to the DNS2000, you should now be ready to process audio.

SOFTWARE CONTROLS



DNS2000 Specific Controls

n Range Selectors

The Range Selectors concentrate the unit's activity into the desired part of the audio spectrum, as follows:

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

Selecting any of these ranges concentrates all of the filters within the DNS2000's filter bank across that part of the audio spectrum.

n **Level Control**

The Level control tells the DNS2000 how much noise is present in the input.

n **Band Gain Controls**

The DNS2000 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 control the DNS2000 using relatively few controls.

The Band Gain controls determine the maximum amount of processing that the DNS2000 will apply in each band.

n **Activity Bargraphs**

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

n **Device Selection**

You can connect the DNS2000 rackmount unit to your Pro Tools system, but until you link it to the Remote Control Software it will do nothing.

The drop-down list on the plug-in displays all the DNS2000 processors that are currently connected to your system, and allows you to select which processor will be controlled by this instance of the Remote Control Software.

n **Audio I/O Status**

When a DNS2000 processor is connected and selected, the drop-down list will report the audio input to which the DNS2000 is locked, the sample rate of the incoming audio, and whether that sample rate lies more than 10% outside the accepted 44.1kHz and 48kHz standards.

Generic Pro Tools Plug-in Controls

n **Bypass**

This control allows you to monitor the processed or unprocessed signals. When Bypass is selected, the 'off' LED will light within the appropriate channel display on the DNS2000 processor front panel. At all other times, the 'on' LED will be lit.

Note: The other controls provided within the Pro Tools header to the plug-in window have generic operation, and are described in the Pro Tools documentation.

Automation

The Band Gain settings, Level and 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.



HARDWARE INDICATORS

USB LEDs

Link

When lit, this indicates a valid USB connection.

Data

This flashes when Pro Tools communicates with the DNS2000 via the USB input.

Input LEDs

AES, SPDIF

The lit LED indicates which audio input is in use. If the LEDs are flashing alternately, there is no valid audio being presented to either of the DNS2000 processor's inputs.

Peak

These LEDs indicate the audio input level. The upper row shows the level on Channel 1, the lower row shows the level on Channel 2.

If the red '0' LED lights continuously for about one second, this indicates input clipping.

Note: The DNS2000 is capable of applying gain to the signal, so the absence of input clipping does not guarantee the absence of output clipping.

Off / On LEDs - Channel 1 & Channel 2

These LEDs indicate whether the channel is selected to process.



Range LEDs - Channel 1 & Channel 2

The three LEDs Low, Mid and High indicate which range(s) is/are selected for processing.

Note: These LEDs will flash a number of times when a given processor and channel are selected from the Remote Control Software. When used in a multi-processor environment, this gives a direct visual indication of the relationship between the Software and each processor.

Gain LEDs - Channel 1 & Channel 2

The twelve Activity LEDs for each channel offer a visual indication of the activity in each of the six bands controlled by the Band Gain controls.

Both LEDs off:	Less than ± 0.5 dB activity
Cut (green) LED dim:	Between 0.5dB and 3dB attenuation
Cut (green) LED bright:	Greater than 3dB attenuation
Boost (red) LED dim:	Between 0.5dB and 3dB gain
Boost (red) LED bright:	Greater than 3dB gain

Each band controls numerous filters. Therefore, the Activity LEDs for a given band display the overall activity in that band, and are not necessarily indicative of the action of any single filter at that moment.

TUTORIAL

Firstly, you must always remember that the DNS2000 Remote Control Software is precisely what it claims to be: Remote Control Software. It performs no audio processing. To process an audio stream you must route it via the DNS2000 rackmount unit. You can do this, for example, by using an insert point within the Pro Tools mixer.

The following tutorial illustrates one way to use the DNS2000. It may not be the way that you choose to operate it for all jobs, but it will get you started...

Selecting a DNS2000 Processor

You can launch the DNS2000 Remote Control Software on your Pro Tools system, but until you tell it which DNS2000 processor to use, it will do nothing.

The drop-down list on the Remote Control Software displays all the DNS2000 processors connected to your system.

- If there is a DNS2000 serial number shown in green on the list, it is available for use on your system.
- OS9.xx users: A red serial number indicates that - perhaps because of a power failure, or because the USB connection has been severed - there is an error communicating with the DNS2000 processor that you have requested.

OS-X users: The following error message indicates that - perhaps because of a power failure, or because the USB connection has been severed - there is an error communicating with the DNS2000 processor that you have requested.



- A grey serial number indicates that the device is allocated to a different instance of the Remote Control Software.

Note: If you select a mono process in the Remote Control Software, you can choose any free channel on any connected DNS2000. If you select a stereo process, this will require a single DNS2000 with both channels free.

OS9.xx users only:

The Range LEDs on the DNS2000 rackmount unit will flash a number of times when a given processor and channel are selected from the Remote Control Software. When used in a multi-processor environment, this gives a direct visual indication of the relationship between the Software and each processor.

Range Selector

First, 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.

Note: With practise, 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. 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 find the point at which this occurs.

Note: When the Band Gain controls are fully down, maximum processing occurs as you increase the Level control, 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 DNS2000's filter bank using the Band Gain controls.

The six faders represent six frequency bands 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.

CASE STUDIES

The following case studies describe just three of the ways in which you can use the DNS2000. You can apply the DNS2000 equally to recorded signals and to 'live' signals at the point of recording or transmission.

Suppressing traffic noise and other ambient sound

The DNS2000 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 DNS2000 is not in Bypass
- Select Full Range
- Set all six Band Gain controls to -24dB
- Raise the Level control 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 LED Bar Graphs in the Remote Control Software, and the LEDs on the DNS2000 processor front panel, 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 alone 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 DNS2000 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.)

The final configuration may look like this:



Suppressing tape hiss

The DNS2000 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 many generations old.

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

You should follow the procedure laid down in case 1 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 in case 1.

Third, refine the Band Gain controls for optimum suppression.

As in case 1, 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 may look like this:



Suppressing excessive reverberation

In many situations, the DNS2000 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 cases 1 and 2, 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 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) the DNS2000 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 may look like this:



TROUBLESHOOTING NON-CEDAR COMPONENTS

If you encounter problems with your Macintosh, MacOS, or Pro Tools, please refer to the relevant Apple or Digidesign manuals, or contact the dealer that supplied these systems 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 OS9.xx or OS-X
- Digidesign hardware
- Digidesign software.

SPECIFICATIONS

General

Power supply: 85–260VAC; 50–60Hz
Dimensions: 1U rackmount, 20cm depth

Audio

I/O type: Digital PCM
I/O resolution: 24 bits
Processor power: 198MFLOPS
Latency: <10 samples

Sample rates: 44.1, 48 kHz
Data formats: SPDIF or AES/EBU
Process resolution: 40 bits

EMC REGULATIONS

In order to comply with EMC regulations, you must connect the DNS2000 using metal-shelled connectors and good quality shielded cable suitable for digital audio.

Declaration of conformity

Date of issue	1 April 2002
Equipment	CEDAR DNS2000
Manufacturer	CEDAR Audio Ltd
Address	20 Home End, Fulbourn, Cambridge CB1 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:

n 89/336/EEC Electromagnetic Compatibility

Applicable standards: EN 55103-1:1996 EN 55103-2:1996

n 73/23/EEC Low Voltage Equipment

Applicable standard: EN 60065:1998

E&OE. The Company reserves the right to change specifications without notice.

LICENSE AND LIMITED WARRANTY

1. DEFINITIONS

In this License 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 CB1 5BS, UK;
- 'the System' means an instance of the DNS2000 sound-reprocessing system comprising hardware and software held on non-volatile memory ('firmware') developed by the Company;
- 'this Document' means this License 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 other intellectual property rights in the System including all documentation and manuals relating thereto are the exclusive property of the Company. The Licensee acknowledges that all such rights are the property of the Company 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.
- 3.2 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.

4. LIMITED WARRANTY AND POST-WARRANTY OBLIGATIONS

- 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.
- 4.4 In the case of any defect or failure in the 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 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

The Licensee may at his discretion assign the 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 the 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 DNS2000

Inspected:	
QC Engineer:	
Serial number:	



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