

# STUDIO SOUND

REVIEW

## CEDAR DNS1000

In the war to rid the planet's recordings and film soundtracks of unwanted noise, CEDAR's Dynamic Noise Suppressor is the engineer's latest weapon. **Rob James** gauges its firepower

**C**EDAR IS IN SERIOUS DANGER of becoming a generic term like Hoover or Biro. Not only do the company's products dominate the field of 'clean up' tools for music recordings but the same hardware and software tools are being used in forensic audio and, on occasion, sound for picture. CEDAR's latest offering, the DNS1000 is aimed squarely at this market.

Based on my own experience and discussions with other mixers, I would say more time is spent on cleaning up location recordings than any other facet of sound for picture mixing. You might assume the quality of location dialogue recordings would have improved as technology has advanced. In fact, due to a combination of factors, if anything the average standard has deteriorated. Restricted budgets, traffic, aircraft, HMI lights which emit multifrequency whistles and noisy cameras in dodgy locations are constant irritants. In drama work, the continuing trend away from a trained, theatrical style of delivery exacerbates the problems. To all this can be added the dramatic increase in usable dynamic range from current theatre sound systems and DVD in the home. The increased dynamic range and resultant increase in SPL conspires to reveal far more of what used to be conveniently hidden. ADR is sometimes seen as one answer, espe-



cially for period drama. However, replacing dialogue is an expensive and time-consuming option. In documentary and other

broadcast areas it is rarely even an option.

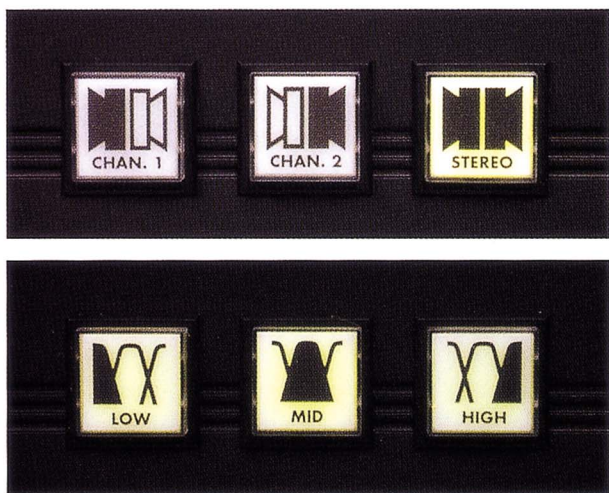
Sound mixers in all these fields have their own favourite weapons in the war against extraneous noise. Filters, expanders, gates, dynamic equalisers—the BSS 901 and devices based on companding noise reduction systems such as the Dolby Cat 43a (Dolby 'A') and Cat 430 (Dolby SR) noise reducers. The latter two devices have had this area to themselves for many years. French manufacturer Elison produced an ill-fated multiband version a few years ago. Perhaps this is not surprising since the size of the market is too small to interest many manufacturers. I believe a machine combining the same virtues of speed and convenience but with a more sophisticated approach using digital DSP technology is long overdue.

### Band centre-frequency table

The table shows the centre frequencies of the bands affected by each band-gain fader of the DNS1000 in each of the operating ranges.

CENTRE OF BAND (Hz)	RANGE					
	Low	Mid	High	Low & Mid	Mid & High	Full
1	24	244	4370	28	261	30
2	40	445	5698	77	577	99
3	69	811	7431	209	1276	329
4	117	1479	9690	573	2822	1094
5	198	2695	12635	1568	6244	3632
6	335	4912	16476	4290	13814	12064

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With all such devices there is a balance to be struck between elimination of unwanted signal and limitation of damage to the programme material. The other requirement is speed and ease of use. In film mixing time is serious money and in live broadcast it is equally precious. This doesn't only apply to operating the device but also learning how to use it. Only occasionally does a control surface come along which immediately feels right. I found the DNS1000's very light action long-throw faders and positive click touch keys immediately satisfying to the touch. In this area of rabid individualists I have no doubt it won't suit everybody but...

As with any dynamic noise suppressor the first step in eliminating unwanted signal is to first identify and remove any dominant fundamental frequency(s) followed by objectionable harmonics using a notch filter, then to apply the DNS1000. Over use of filtering leads to objectionable artefacts. Human hearing is so adaptable it is possible to seriously degrade a signal without realising it. Therefore it is essential to continually check effects against the

### Panel work

THE DNS1000 IS A COMPACT stand alone unit. On the gently sloping front panel seven faders, seven illuminated keys and 12 LEDs completely belie the power under the hood. The rear panel is simpler still, a pair of XLRs and a pair of phono sockets cater for AES-EBU and SPDIF digital I-O, four LEDs indicate sampling rate and a combined IEC mains socket and switch complete the picture. Because some potential users will want to mount the unit in a console surface I suspect they would prefer an external power supply. I also think the option of analogue I-O would be desirable.

The three keys on the left simply determine whether the unit processes the left, right or both channels. On the right, the Bypass switch is essential for checking the effect. The remaining three keys determine the frequency range to be treated. Logically, the left-hand key gives low, the

either raise each of the other faders in turn, as far as possible, until the unwanted signal is heard alternatively you can start with all the band gain faders at zero and lower them until the unwanted signal disappears. CEDAR recommends the latter approach but I have always reckoned it is easier to hear something appear than disappear. In practice, the process is recursive so the level fader will probably benefit from tweaking once the band gain controls are set. All of this is a great deal easier and quicker to do than describe and, once I had my head around the ranges, completely intuitive.

I used a wide range of material in testing the DNS1000. The noise pollutants included projector noise, film camera noise, traffic and reverb. CEDAR supplied some sample material and I began with this. I am always a little cynical about material supplied by manufacturers but in this case, after testing with my own stuff, it seems pretty representative.

At first I was slightly disappointed by the processing artefacts. At least I was disappointed until I hit the BYPASS key and an astonishing level of rubbish was revealed.

middle key, mid and the right high. A wider spread can be obtained by using the keys in combination. Low and mid, mid and high or by pressing the left and right keys together, full range. CEDAR has cleverly arranged things so either pressing two keys together or pressing a second key while the first is flashing links ranges.

The left-hand fader is used to set the overall level of noise present in the input signal. The remaining six faders have a pair of LEDs which indicate the activity in each of the control bands. Dim green equals between 0.5dB and 3dB of cut, bright green, more than 3dB. The red LEDs indicate boost.

Latency is quoted as being below 10 samples or less than  $1/200$ th of a frame, unnoticeable for practical purposes. Sampling rates are 32kHz, 44.1kHz or 48kHz with around 4% tolerance for varispeed. Both interfaces are 24-bit.

original to ensure the baby is not being thrown out with the bath water.

Adjusting the DNS1000 begins with all the faders down. The Level (left) fader is raised until the unwanted signal disappears. If it doesn't, you should try another range, or two ranges together. If the unwanted signal is still present, select the full range using the left and right keys together. The next step is to

I moved on to try some examples of my own. Moderate levels of noise were almost completely eliminated with trivial degradation to the wanted signal. As a final test I used some material which I had spent several hours attempting to clean up using other tools. This was a mixed track with music and street sounds behind the (wanted) dialogue. I was able to achieve a vastly better result in minutes using the DNS1000. There are other tools available which can, in combination, achieve similar results. However, they are notoriously finicky to adjust and generally inconvenient to use.

The DNS1000 has another trick up its sleeve. It used to be a standing joke among mixers that inexperienced or ignorant directors would sometimes ask them to remove reverb—'Don't you have a box to do that?' Much hilarity all round.

We may well have to find another joke. While it cannot completely eliminate reverb the DNS1000 is by far the most effective, quickest and least temperamental method I have come across to date. Perhaps the best way to describe the effect is the room seems to shrink in size.

This deceptively simple control surface disguises a seriously complex process. Two 40-bit floating point Texas Instruments DSP chips are employed to provide, at present, 18 bands of adaptive dynamic filtering. The number of bands controlled by each fader is not fixed and the bandwidth of the filters is not the same as conventional third-octave types so centre frequencies do not necessarily indicate the frequency at which the greatest signal attenuation occurs. The bandwidth is varied to suit the selected range. The range of frequencies affected may therefore be either smaller or larger than the figures seem to suggest, depending upon the signal content.

This unit is a near perfect compromise between effectiveness, simplicity of operation and sufficient control over a complex process. The wish list is pretty short. Since virtually all film mixing is now done on fully automated consoles a way of interfacing it with automation systems would put the icing on the cake. It would probably also double the price...

When trying to make a silk purse out of a sow's ear, which is the *raison d'être* here, there is no such thing as perfection. By designing a tool which achieves results which are equal to or better than processes which either take ages to adjust or hours to crunch CEDAR has come remarkably close. Essential. □

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