

CEDAR DC1 DECLICKER

In *Studio Sound's* October 1993 issue we looked at CEDAR's *CR1 DeCrackler*, the company's latest software-module-in-a-box, and made passing reference to the *DC1 DeClicker*. Since the *DC1* was the first model of this type, predating the *CR1* by some time, and since it represents more closely the image most people have of what CEDAR is all about (however wide of the mark that might be), it warrants more detailed inspection.

To recap briefly: CEDAR recognised some time ago that their complete audio-restoration system was out of the financial reach of most nonspecialist facilities, but elements of what it does would be particularly useful in areas of the business. They therefore decided to produce stand-alone units duplicating the various constituent software modules of the whole system—the first was the *DC1*.

The software in the *DC1*, as the name suggests, specifically targets clicks as opposed to other types of background noise—crackles, hiss, buzzes and so on. CEDAR themselves loosely subdivide clicks into three categories according to their size and nature, which they refer to as ticks, clicks and scratches. The difference is largely defined by the nature of the treatment required to remove them, and translates into three algorithms in the software.

Physically the *DC1* is virtually identical to its more recent stablemate. Operation revolves around a large blue LCD with five soft keys and a large data wheel, and is surprisingly uncomplicated—there is even less to adjust than on the *CR1*. Signal can be presented to the unit in analogue or digital form, balanced or unbalanced, SPDIF or AES-EBU, and all output formats are available simultaneously. Analogue use will require the use of the large,

bright input and output meters in conjunction with a single input-level control, and even with digital signals these should be watched as the internal 32-bit processing could conceivably produce output levels exceeding the input levels. This eventuality is coped with by a digital output attenuator.

Making the *DC1* do its job really could not be simpler, but an understanding of the difference between the types of processing algorithm is of help. The algorithms are simply referred to as Small, Medium and Large, but since increasing the size of the signal disturbance alters the nature of the problem and the methods required to solve it, they cannot be considered as increasing degrees of the same thing; they are three quite distinct processes.

The Small setting assumes the presence of a very short click (CEDAR's 'tick') which would appear pretty much as a single vertical line superimposed on the waveform of the original signal. All the computer has to do is remove that vertical line and join up the ends of what is left.

The Medium setting assumes a longer disturbance, clearly spread across several cycles of the waveform. Simply joining up the ends in this case would obviously result in distortion of the original signal, so the software uses AI and modelling techniques to calculate what ought to have been there. Since it can perform 50 million calculations per second, it claims to be capable of dealing with 5,000 such clicks across the two channels every second.

The Large setting recognises that certain types of click may have aftereffects lasting considerably longer than the initial offending noise. The most obvious example is a bad scratch on a record which can

induce resonances in the pickup arm; these then show up as low frequencies superimposed on the signal. Simply removing the click (as in the Medium setting) can leave the low-frequency 'tail' intact, resulting in a popping effect when this appears after the corrected gap. The Large setting therefore attempts to deal with any such aftereffects in addition to the basic declicking function.

In practice, of course, the most appropriate setting can quickly be found by trial and error, since it is so simple to switch between them; it may be worth pointing out that the system operates in real time, in case there is anyone who still thinks it is a drawn-out process. Once the algorithm has been decided upon, the only remaining adjustment is the Threshold, which dictates how hard the whole process works.

I used the same DAT tape full of 78 transcriptions as for the *CR1* review, safe in the knowledge that this time it would be more suitable as test material than it had been then. The results, with the minimum of fiddling about, were as dramatic as could be hoped. It is quite uncanny to hear how good the recording on an old 78 really can be under all that surface damage, and how low the real noise-floor of the medium is. Setting the unit up is so straightforward that it is quite difficult to introduce offending side effects, and very simple to eliminate them altogether leaving nothing more than the wanted signal and any steady-state noise, which, obviously, this process does not touch. It is possible to get the feeling that some treble is missing, but careful listening always reveals that the main HF component in the unprocessed signal is the surface damage, and that the underlying recording retains any extreme top end it may have had to start with. Nothing I tried—from operatic arias to trad jazz—showed any signs of side effects, and far from disturbing low-level signals the process revealed

more ambience and detail than one might credit medium with carrying.

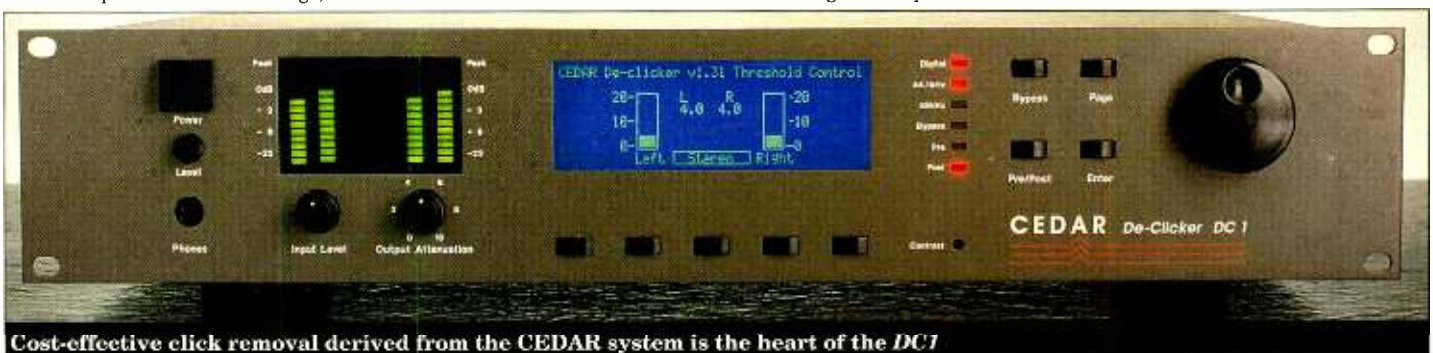
My choice of test material, however, makes me guilty of the same assumptions about CEDAR as most of the rest of the industry. True, their early associations were with archives of early recordings which required restoration, but that kind of work now constitutes a small part—less than 10% by CEDAR's reckoning—of the use to which their products are put. The process is just as happy dealing with LP records, film soundtracks—optical and magnetic—and digital clicks as it is with 78s and cylinders. Current users of the *DC1* comprise mostly of mastering facilities—not just the specialist restoration ones—and broadcast studios. Many radio stations are using them to archive their vinyl libraries to a digital medium such as CD-R, and some even use them live on-air to safeguard against rogue clicks offending their listeners.

There is no doubt that the *DC1* delivers the goods, exactly as promised, in the most effective and user-friendly way possible. Some might say that at that price it had better work—although it is vastly cheaper than the complete CEDAR system it is still strictly for the serious user. Enough of such serious users have already stumped up for one, however, to demonstrate that if you regularly encounter the kind of problems it sets out to solve then the *DC1* is an indispensable tool. ■

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Cost-effective click removal derived from the CEDAR system is the heart of the *DC1*