

# CEDAR Cambridge Series III V6

The latest update to CEDAR Audio's flagship audio restoration and speech enhancement system renders a suitably impressed **BILL LACEY** speechless... well, almost.



It's not hard to recall my first impressions upon seeing a CEDAR system while at BMG/RCA Studios in the early 1990s. I had been painstakingly restoring over 50 CDs' worth of vintage recordings by Arturo Toscanini and the NBC Symphony, editing each tick and crackle one by one with an early Sony digital editor. The CEDAR system at the time offered real-time and offline processing, shortly moving to all real-time processing. What so impressed us was the quality of the sound that it offered, and to this day it is that supremely important factor that continues to be the hallmark of the CEDAR product line.

Fast forward 20 years, and it's clear that CEDAR has not rested on its laurels, and with Version 6 of the Cambridge Series III it continues to innovate, with new modules including Reshape, Adaptive Limiter, Peak and Power Normalisers, and the Action List. These have been designed to overcome some tricky challenges, in particular those that require the processing of large numbers of source files that have different tone, dynamics and spatial characteristics.

Let's take a close look at each and explain the workflow and benefits of using them.

Reshape is a module that takes the idea of a 'matching equaliser' but establishes a whole new category for itself. While traditional approaches have sought to impose the tonal characteristic of one sound upon another, Reshape takes a bold step beyond by also analysing and imposing the spatial characteristics — or stereo width — of the template track. Sporting a set of simple controls, Reshape first analyses the source file that will generate the template, and prompts you to save the results. The visual display renders a tonal spectrum of the target in the upper panel, and the spatial width in the lower panel. The destination audio is loaded into the File Processor, and clicking on the Preview button allows the user to audition the results. Two simple controls labeled EQ and Space allows users to determine the degree of spectrum (EQ) and spatial (width) characteristics that are imposed, ranging from 0 (no effect) to 100 (full effect).

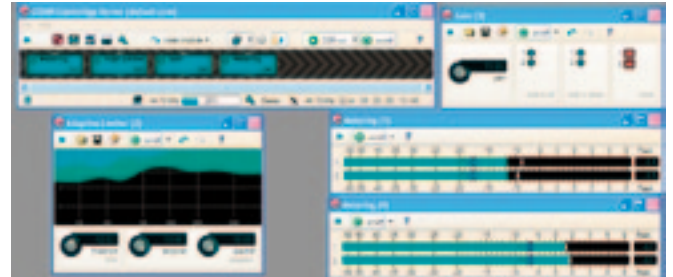
There are many uses for Reshape, and I sought to test a few to determine just how good it sounded. My first test involved taking some dialogue recorded for a documentary where the interviewee periodically crossed his arms and obstructed the lavalier mic.

Under normal circumstances it would have taken considerable time tweaking an equaliser to match the audio. Instead I used Reshape to analyse a section of clean dialogue and applied it to the problem areas. With just a few moments of tweaking the spectrum and spatial controls I found myself very close to where I needed to be, and some further equalisation gave me an acceptable match in dramatically less time.

Next, I was eager to get a sense of just how well it handled spatial characteristics. I grabbed a song from a Tony Williams CD I was remastering and applied some MS equalisation to it, and boosted the level of the side channel a few dB to widen the spatial characteristics. I then created a Reshape profile of the original track for reference, a profile of the modified track, and finally applied the latter profile to the original track to hear how closely the 'Reshaped' track matched. I was really very impressed by how good a job it did, especially with regards to the spatial characteristics, and the 'before' and 'after' profiles showed that the two were now almost indistinguishable.

The Adaptive Limiter breaks new ground as well. Traditional limiters operate by preventing peaks from exceeding a user-defined threshold. Multiband limiters

do the same, having divided the spectrum into a small number of discreet bands. CEDAR's Adaptive Limiter takes a different approach, employing an algorithm that calculates a continuously variable profile to create a more natural sounding result than is possible with conventional limiters. In addition to a threshold control, the Adaptive Limiter offers control of temporal characteristics (the rate at which the



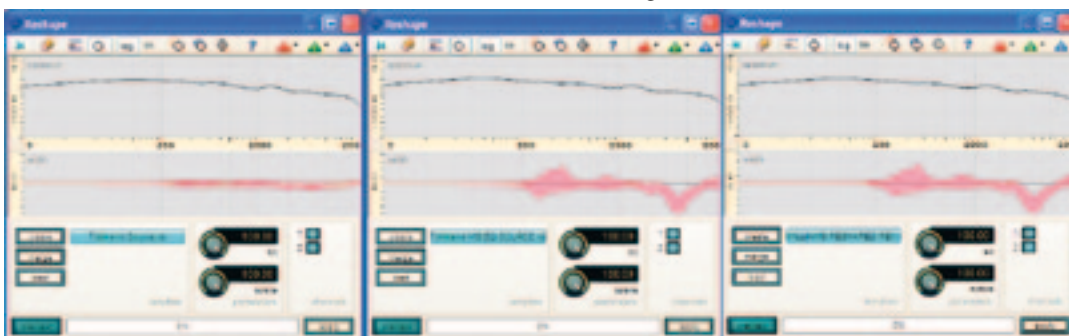
**Adaptive Limiter with before/after metering showing 12dB increase in average level.**

profile is allowed to change over time) and spectral characteristics (the degree to which the profile can change from one frequency to the next), and CEDAR provides a useful visual display that details the Peak and Minimum attenuation at each frequency in real time. At their lowest settings, the Adaptive Limiter comes close to operating like a single-band limiter, but when these controls are pushed toward their maximum it really shines. How does it sound? Loud and clean! And those are two words that don't always go together with digital limiters.

The perceived loudness of music has become the bane of mastering engineers worldwide, as artists, producers, and record labels push for ever louder masters. And while masters have got louder over the last decade at the expense of dynamic range, they continue to expose the inability of traditional brickwall limiters to make programme louder without introducing artefacts (typically distortion and brittleness). This is where CEDAR's Adaptive Limiter makes a difference. It immediately yields cleaner and more transparent sound that is louder in level so, if you have a client who insists on mastering their music louder than you feel is appropriate, you will at least be able to get there with fewer artefacts and a better sound than anything I've heard to date.

For a test, I decided to push the Adaptive Limiter past the point that other limiters begin to crunch the sound and generate unpleasant brittle hash. I placed peak meters before and after the Adaptive Limiter to monitor the results (see screenshot). My source sound peaked at -2dB, so I boldly set my threshold on the Adaptive Limiter to -12dB and added a gain module after it set to +12dB, thereby boosting the peak level by 2dB but the average level by a massive 12dB. Setting my temporal and spectral controls to their maximum value, I immediately obtained a cleaner sound than the well-known limiter running on my Pro Tools system. And if you're forced to make them even louder (not that I would encourage you to do so), you'll be able to go much further before the artefacts become obtrusive.

Peak and Power Normalisers are useful utilities that, like Reshape, fall into the Track Process category. The Peak Normaliser behaves as any traditional normaliser might work, in that it raises or lowers the level of a track to a user-defined setting — typically 0dB. It offers a choice between peak (the traditional operation of a normaliser) and over-sampling peak, which avoids distortion in some A-DCs when normalising to 0dB. It also offers a useful Statistics button, which allows users to locate the actual peaks in the track.



**Left – original; Centre – MS-EQ target profile; Right – profile of source after Reshape applied.**



**The Action List in 'action', batch processing a number of music tracks.**

The great disadvantage of working with peak levels is that they are incapable of representing how loud we perceive sound, so mastering engineers who work with compilations of songs recorded at differing levels will immediately appreciate the Power Normaliser. This allows the user to determine the perceived loudness of a sound and apply a normalisation based on one of five industry standards: RMS, ITU 1770, A-weighted, B-weighted, or C-weighted. The controls are simple, allowing the user to first measure the power of the selected material, and then determine the appropriate target level using the appropriate standard.

In practice this makes it simple to take a large batch of sources and conform everything to a particular perceived loudness, but it's just as effective when working with a smaller number of tracks, and Power Normalisation is a useful tool before applying



**Auto Dehiss in M-S Mode, attenuating hiss in just the stereo signal.**

subsequent mastering or restoration processes.

The Action List is the final module introduced in Version 6, and it really changes the game in batch processing of audio. It permits background processing of all streaming processes, as well as track-based processes, such as Reshape and the Peak and Power Normalisers. Once the Source and Destination folders for one or more instances of CEDAR Cambridge are set up, you can drop files into them for transparent background processing while

still working with the full capabilities of another instance of CEDAR Cambridge in the foreground. It takes very little effort to create a sequence of processes that can be applied automatically to any number of files dropped into the chosen Source folder, and there is no restriction to the ordering of those processes.

As an example, imagine that you have hundreds of spoken-word interviews that need a little bit of Power Normalisation to smooth out the perceived loudness, Declick-2 to remove impulsive noises, Auto Dehiss to restrain the noise, Reshape to conform the sonic characteristics of all tracks, and an Adaptive Limiter to maximise the overall level of all the tracks before delivery to your client. The Action List takes a few minutes to set up, and once you've created it and initiated the batch processor, any files dropped in the Source folder (locally

or across the network) will be processed and delivered to the chosen destination. For large-scale projects this can make the difference between cost effectiveness and impracticality.

Not only is CEDAR Cambridge a multichannel system, but you can also use it in M-S mode. While of great benefit to mastering engineers, there are also significant implications for those restoring audio because the ability to restore is greatly increased if you can treat the side independently from the mid. While this feature has always existed in CEDAR Cambridge, many users don't seem to be aware of it. It's a unique ability, and if you're not taking advantage of it you're missing out on one of the real strengths of CEDAR Cambridge.

There are few innovators in the audio industry, but CEDAR continues to pioneer new ideas and raise the standard. While the cost of entry is at a premium, you can certainly justify your investment with the quality of your return. CEDAR has become the gold standard by which all others are judged. CEDAR Cambridge itself is big and powerful and while it can take a little time to explore all its possibilities, the quality of the result is unmatched. ■

#### PROS

Extremely useful for large scale batch processing, as well as individual jobs that require time and attention to detail; M-S processing especially useful in mastering and restoration applications.

#### CONS

You may inadvertently contribute to an escalation of the 'loudness wars' by pushing the Adaptive Limiter to the edge (but at least your masters will sound better!)

#### Contact

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