

CEDAR AZX+

Although it addresses a tricky problem, CEDAR's azimuth corrector is so simple a child can drive it. **Dave Foister** accept the challenge



Audio restoration is usually taken to mean the removal of something. The assumption is that rubbish of some sort has been grafted on to the intended signal—noise, clicks, crackles, distortion, buzzes—and the job is to get rid of it. In most cases that's true, but some processes alter the signal in specific ways without necessarily adding to it, and these problems also need to be addressed. Analogue recording is a good example, since misalignment of the mechanics of a recorder will degrade the signal without adding anything, and this is why the last process CEDAR introduced was Azimuth Correction. This first appeared in the Series 2 hardware range some years ago, and much more recently became a welcome addition to the Series X range of affordable 1U-high processors in the form of the AZX+.

Azimuth, for the benefit of those brought up entirely in the digital age, is the angle of the gap in a record-replay head in relation to the direction of travel of the tape, and should always be at 90°. If replay head azimuth is out of adjustment a small time-offset is introduced that will cause comb filtering when the two are summed to mono, and will also compromise the definition of the stereo image. In fact it goes further; the head gaps themselves will not be reading the same point in time across their individual widths, and the resulting smear will cause a smaller degree of comb filtering and HF loss on each track. Of course, like so many machine alignment parameters, it should never be assumed that the machine a tape was recorded on

was correctly aligned, and strictly speaking the correct replay azimuth for a given tape is the angle that matches the azimuth of the record head that produced it. With this in mind all tapes should carry an HF tone that not only allows for HF equalisation setting but allows the azimuth to be set correctly for that tape.

For those of us remastering from analogue originals, this causes no problem. The replay machine can be aligned to the tape, and even in the absence of tones a pretty accurate setting can be achieved by summing the channels and adjusting for maximum HF content, a position that

is usually very easy to find. But what if we are presented with a copy of that original that was made without the necessary care being taken? Our DAT, CD or whatever has the azimuth error embedded in it and has no corresponding adjustment to put it right. This is where the AZX+ gets patched in.

Since all the problems are caused by the fact that information common to both channels is no longer correctly synchronised, the job of the AZX+ is to time-shift the two channels relative to each other to bring them back into perfect sync. Its operation is in most cases completely automatic, as it looks for correlated signals and adjusts the inter-channel timing to align them. It does this by constantly monitoring the signal on a sample-by-sample basis, and its adjustment is in increments of as little as a hundredth of a sample. The current adjustment is shown on a bright green display, and the process can be monitored in two ways. One is a simple PRE-POST switch that simply disables the time shifting process, allowing glitch-free comparison between the input and the output. For critical assessment the output can be switched to mono, which will exaggerate the effect of the original errors, and the mono signal can also read the difference between the two channels. With a mono source, correct alignment will be shown by complete cancellation of the difference signal, and with a stereo source too central components will cancel in this mode.

In the vast majority of cases that will be the end of the matter. Only where there is some anomalous content, such as a deliberate delay-based stereo effect, in the source will the automatic correction get confused, and then a manual mode is available with coarse and fine adjustment, complete with guiding red arrow lights to show where the automatic detection would have set it. For manual use the monitor modes become valuable tools rather than just confidence checks; the drawback is that the chosen offset remains fixed even if the original alignment varies, as indeed it generally does as the tape weaves across the heads. Automatic mode is constantly correcting for such changes so should be the method of choice in all but the most difficult of cases.

The hardware set-up is familiar enough; digital I-Os only (either sort), simple push buttons and indicators, and a single push-pull rotary encoder beside the display, all on a neat 1U black box. Operation is so simple that the manual is superfluous, and all-importantly the process works. Even tapes that sound pretty much OK as they are can

come out of the CEDAR AZX+ sounding clearer and more focused, with none of the occasional HF uncertainties that indicate a tape path on the edge. One more annoying problem eliminated. ■

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