



## Cedar DeBuzz, Azimuth Corrector, Sadie DeClick/DeThump/DeCrackle

**GLENN MEADOWS** explains how to remove unwanted sound with the new Cedar X Series Plus processors and Sadie plug-ins.

### information

Being a long-time Cedar user (all the way back to the original non real-time Cedar 1 processing), seeing the new X Series of simple tools has been an interesting education in the decrease in cost versus increase in processing power. Our early system, which has been upgraded and is still in constant use, cost multi-tens of thousands of dollars and is PC-based, doing one process at a time, still being the Cedar for DOS system. (Note: current PC-based systems are PC for Windows systems and, with the addition of multiple boards, the ability to do multiple processes at once is possible.)

### Cedar De-Buzzer

Like all of the Cedar X Series boxes, the user interface has been reduced to its most basic elements, making it easy and simple to use. While that might remove flexibility and the ability for subtle control, for everyday use its simplicity is a blessing. It almost becomes an 'appliance' — set it and forget it.

Control wise, on the front, the 1U box has a power switch, indicators and/or switches for Input Source (AES/SPDIF), Output (0dB or -3dB of attenuation), Process (on/off), a rotary control for Buzz Power and Attenuation (of the buzz). There is a small back-lit LCD panel to readout frequency and other user adjustments and a detented push/rotary knob for selecting presets and making adjustments to those items. On the back there are power and AES/SPDIF ins and outs - simple and clean.

Operation is, again, simplicity in itself. Push and turn the knob to select the fundamental frequency (50Hz or 60Hz, for example). If you know the fundamental, just select it. If you don't, you can go to Manual mode and dial in the fundamental. In Fine mode, you can move the fundamental in a range of 0.01Hz if you're below 100Hz, and in 0.1Hz steps if over 100Hz. Once you've found the fundamental, the system is ready to go.

During the 'discovery' mode, where you were looking for the fundamental, you will have set the buzz power and attenuation to their maximum settings, so you can hear exactly what's being removed. In most cases, this is way over processing; a lot of artifacts and comb filter effects will be audible (someone is going to want that as part of their new sound, I guarantee it!). Anyway, after you've hit the fundamental, just back off the Buzz Power and Attenuation to give you the desired removal of the buzz with the least damage to the material. In almost all the cases I tried, I was easily able to achieve a balance where I could perceive no loss of any musical quality or detail, while the offending buzz/hum was effectively removed.

One of the test sources we had was a cassette recording of a corporate convention key note speech that had massive amounts of 50Hz-based hum/buzz on it, effectively covering the speech being given. We ran it through

the BRX and, once set up, all we had left was a trace of high-frequency buzziness and the cassette hiss. Interestingly, since the source was a cassette, there was slight speed variation as the tape played (it had been transferred to digital tape then to CD, so any speed variation was in the source tape). Once the BRX had locked onto the basic fundamental, it would track the slight frequency change and all the other frequencies in the harmonic structure would follow, so there was no 'wind chime' effect as the frequency drifted in and out of the filter range. I took that de-buzzed signal and recorded it into my SADIe and used the De-Crackle to finish the job, but more on that later.

All in all, for the price, the BRX is a good tool to have around for removing guitar hum/buzz and ground loop humm/buzz. If you are processing stereo tracks out of a mix, there will be an off-set delay, so it is best to use a HD system where you can slip the tracks back in sync. If it's just a stereo signal, then the delay is not important since you're probably not locking to anything else.

### **AZX Azimuth Corrector**

Also, new to the X Series 1U boxes, is a new version of their tool that is available in the PC-based system, as well as part of their mid-priced series of dedicated processors. This unit is, once again, modeled on the ease-of-use approach, providing internal capabilities that make the use of the box almost a no brainer.

Again, the controls are few and self-explanatory - power and input selector/indicator for AES/SPDIF and a group of three indicators for monitoring: Stereo/Mono, Sum/Difference, Pre/Post and, finally, the same type of back-lit LCD/rotary knob assembly for selecting presets and making changes. The rear is the same - power and AES/SPDIF I/O.

In Auto mode, the box just plain works. This is a new version of their old Phase/Time corrector module that is available in the PC version of their system. It works by analyzing the 'mono' content of the stereo signal, measuring the time offset between channels and doing an appropriate micro-sample time shift to eliminate that time difference. While doing an azimuth correction manually on a tape machine, not only do you get the physical alignment of the tracks, but you also pick up an increase in top end. With the AZX, you get the physical alignment of the tracks but no 'increase' in top end. What you do get is an improved sound field because of proper alignment between left and right channels.

Like the BRX, the AZX also has an auto tracking mode that will follow the azimuth if it wanders a bit, as in a cassette tape or an old analog master you are restoring, which is wobbling because of storage curl. This is what makes the AZX almost a set-and-forget processor. In actual use, it's simple to just play the audio through the box, enable the Auto function and let it determine what correction is needed and apply it.

To tell what it is actually doing, you can change the output to listen in mono (normal flanging is typically reduced or gone). You also have the ability to listen to the difference signal. In this monitor mode, as most mastering engineers have used for years, you can hear the improved phase alignment because the center channel info will completely go away. An improperly phase-aligned signal will have some portion of the high end still audible in the difference/mono mode, indicating that the azimuth is incorrect. For years, mastering engineers have used this monitor mode to nail the azimuth setting on a tape, independent of what the alignment tones told you. On the old analog mastering tape machines, most had a calibrated azimuth adjustment knob so you could correct for azimuth errors on a cut-by-cut basis. That was ultra important with tapes from older machines that did not have constant tension and for use in compilations where session tones might vary from one song to another or were recorded on different machines in different studios for the same album.

On the experimental tests I performed, actually mis-aligning the analog source machine, the AZX simply tracked the changes as I turned the knob, keeping the two channels in proper phase alignment. There were no detectable artifacts as I did that, only the slight loss of high end one would normally expect with an azimuth error. But, the stereo image kept its same nice open space. Taking the AZX into bypass mode made the improvement in stereo imaging instantly obvious.

Another useful place for this processor would be in a video facility, where tapes have already been transferred to some digital video format, but early in the process a set of heads were not aligned properly. As with the BRX, the AZX does have an inherent processing delay in it, so some form of HD system would be necessary to re-synchronize the audio back to the picture. That's pretty easy to do with today's technology, so I don't consider it a real problem. Besides, the finished results far outweigh the extra step of re-synching the audio and video.

AZX is a nice tool, especially if you're in an audio restoration facility.

### **Cedar Declick 96kHz Plug-In For Sadie**

For quite some time, Cedar has had available the Hiss Removal plug-in that works with the SADiE editor. The broadband noise removal is very handy and works quite well. About a year ago, they released another plug-in — declck. Now they have updated that to allow declck (both electrical interferences and clicks from disk transfers to run on files recorded at 96kHz, all integrated into the SADiE editing system. The interface to this new module is either of two directions. First, and easiest for removing the one or two clicks that might be on a client's tape, is via the Region Editing tools. You essentially draw over the offending click with the drawing tool to select the region and, from the Region Editing toolbar, click Cedar Declick. That takes the region, cuts it out, bounces it to the PC disc, processes the declck, re-imports the audio back to the playlist and seamlessly splices it back in place, sans any click/clicks that were in the region. The algorithm is very intelligent, working all the way from those faint little annoying digital ticks from word clock problems, up to and including large disk clicks and pops.

A noisy record would be very tedious to do in the draw/process mode, even though the processing is very fast. So, the second method is to process the entire track. That takes a bit more time, of course, and during this time there is no sound, unlike the PC-based declck, which is a full real-time process where you hear the results as they are done. Then again, the price is quite different.

I used both methods on various projects over a two-month period, all with excellent success. There was a lip smack in the ring out of a piano/vocal piece that the declck just simply removed. No burble/gurgle in the ring out, just the click gone. (Luckily there was no reverb added to the vocal to make the click 'reverberant'.) I rarely get tapes or masters from clients that have clicks in them, but I know many others in the industry do, and those with SADiE will really appreciate the speed and usefulness of this plug-in. Too bad more people can't directly take advantage of it.

As a further test, I did record in a full LP that we are restoring at 96kHz using our Prism AD-2 converters and going straight into SADiE and then doing the full track process function. Including the bounce, the 40-minute LP took about an hour to process, including the high-speed bounce to and from the system drive. The processing time to declck is also controlled by the speed of the host processor. Since I'm running a PIII 700MHz processor, the processing moved along pretty quick.

The results of this were very satisfying. I didn't feel that there was any real loss of detail and high end, just a removal of the clicks/pops like I expected. What was interesting though, and this problem has existed for a long time with all declck products on large loud pops, is when the click is removed there is often left an LF thump, which covers a long time frame. It is not easily removed, other than by applying a filter. I've heard these for many years with our PC-based system, and the SADiE declck has many times left these behind. Up until now, there has not been a simple solution. Read on.

### **SADiE Cedar Dethump Processing**

Another new option for SADiE, and not available in any of the other Cedar products, is a new and totally amazing process: Dethump. This fully removes the LF 'thump' left by removal of heavy 'pops', as well as the thumps that show up in pressings that have a visual 'pock marking' in the vinyl. In the past, these items typically were selectively filtered out via LF processing. That was always a compromise with having to make the trade-off from LF content to the intrusion of the thump.

Taking the same product I used in the declck testing, I played it through and found the thump spots. Using the same Region Editing tools, I just highlighted the portion of the waveform that had the thump in it and clicked on the Cedar Dethump button. Again, this took a larger portion of the audio and bounced that segment to the PC drive after it asked me 'How many thumps in the marked region?'. I Entered 1 and off the program went. It took about a four-second chunk of audio and processed it for about 30 seconds and then bounced it back.

Much to my amazement, the thump was completely gone with no loss of low end, including no change in the rumble perspective. This is usually the first area where you notice selective filtering in the extreme bottom — that characteristic LF wash that you get from playing a disk. With the dethump, all that was gone was the thump.

Working through the whole LP, I was able to remove all the thumps and then process for rumble removal with LF filtering and EQ. Again, this is a very worthwhile plug-in for SADiE users to add to their arsenal if they are delving into disk restoration work — highly impressive.

### SADiE Cedar Decrackle

The last piece to the basic restoration tools for SADiE/Cedar plug-ins is the just released Decrackle plug-in. Now, we have a fully integrated set of tools for the SADiE platform. If you recall, in my earlier review of the BRX Buzz Remover, one of my test cases had a bit of HF buzziness left in it and, rather than filtering it, a decrackler would be ideal. So, with this new plug-in, we were ready to give it a try and see if we could remove the balance of the old 'nasty' from the audio. I transferred the audio to the workstation and off we went into Decrackle land.

Again, the SADiE/Cedar Decrackle uses the same type of interface as the Declick and Dethump. You can do Manual decrackle, where you highlight a region and tell it to decrackle it, or you can select an entire clip (could be a song) and use Auto Decrackle, where the system will pre-process the file, audition it and, if you say okay, will finish it and bounce it back into the playlist at the same spot. On our original cassette tape with the hum, a single pass with Auto Decrackle effectively removed the last little traces of the buzz, leaving only the tape hiss from the original cassette tape recording.

Having the PC-Based version allowed me to make some comparisons. The PC version has two controls, a Split and Level control, that you can adjust to manually set the way decrackle works. In the SADiE version, it's all automatic.

Auto Decrackle, while a bit time intensive, worked equally well. For an automated process, working on typical projects will be a welcome addition to the restoration toolbox.

So, let's take our phonograph recording that we've used in the prior reviews and add the Decrackle to it. Taking it song by song, there was some surface crackle in spots on several songs, and on another a fairly continuous crackle through another whole song. Manual Decrackle as well as the Auto function did exactly as expected. The various surface noises were removed with minimal intrusion into the music. Again, a fast processor helps with things like this, so I was glad for my recent CPU upgrade.

Cedar has released a nice multiple set of both hardware boxes and plug-ins for the SADiE platform that combined, or individually, will allow any careful user to enter the area of restoration work and, for most regular projects, create excellent results. There will always be the time though that you will really need the heavy artillery of a full-blown restoration system, which are all still available.

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### INFORMATION

**Cedar De-Buzz \$6555; Azimuth Corrector \$5695.**



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