

A New Approach to Repairing Analog Distortion with Diamond Cut

One type of noise that we haven't talked much about in our frequency domain series is Distortion. There are several types of distortion that you might commonly run into as you restore older recordings. The one you may be most familiar with is common digital distortion caused by clipping on the incoming audio signal. If you record with the incoming signal too "hot", you'll find the nicely shaped sine waves will have a flat top to them. You can actually see them as you zoom into the audio.

DC Five has a tool to fix this problem and it's the Declipper. Basically, this tool finds the flattened points of waves and mathematically "rounds" them out which removes a lot of the harmonic content that we hear as distortion.

Do you remember our earlier frequency domain articles? A pure sine wave has one frequency only, but any misshaping of that wave results in lots of other frequencies being produced. This is why the distortion of a sine wave sounds bad - you now have lots of undesirable frequencies in the signal. The classic way to see this is to use the Make Waves function of DC Five and create a sine wave. Zoom in so you can see the perfect sine wave and play it with the Spectrum Analyzer up. You'll see only one frequency in this wave. Now make a square wave and play it. Notice you now have many frequencies. The bottom line - a distorted signal has extra and probably undesirable frequencies in it.

Now onto analog distortion such as you might find on analog tape due to over saturation during recording.

No matter how carefully you look thru the list of tools in DC Five, you won't find one that is labeled "DeStortion". The Declipper function is normally not too effective on analog distortion since the waves are not nicely flattened off. So what to do? The answer is a tool that you probably never thought to use to correct this problem - the DeEsser. This tool is inside the Dynamics Processor. More accurately, this tool is a "variable frequency DeEsser" which makes it usable for our distortion reducing needs.

For those who don't know, a Deesser is used to reduce the annoying "SSing" sounds that some singers and speakers create which they end a word with an "S" sound. This snakelike hissing can be distracting to listeners and the Deesser is used to reduce it.

This tool allows you to adjust the target frequency while you listen and this makes it useful in removing analog distortion. Remember, we have unwanted and typically higher frequencies in a distorted signal, and our Deesser can be focused on them by adjusting this slider while you listen.

This won't work on every possible distortion event, of course, but we've seen it work close to a miracle on several. Use one of the Deesser presets in the Dynamics Processor and give it a try while adjusting the frequency slider. It's easy and certainly makes a strong improvement in many distorted files.

For more information on Audio Restoration and Enhancement as well as other Audio information, don't hesitate to contact Tracer Technologies toll free at 866 260 6376 or email info@tracertek.com