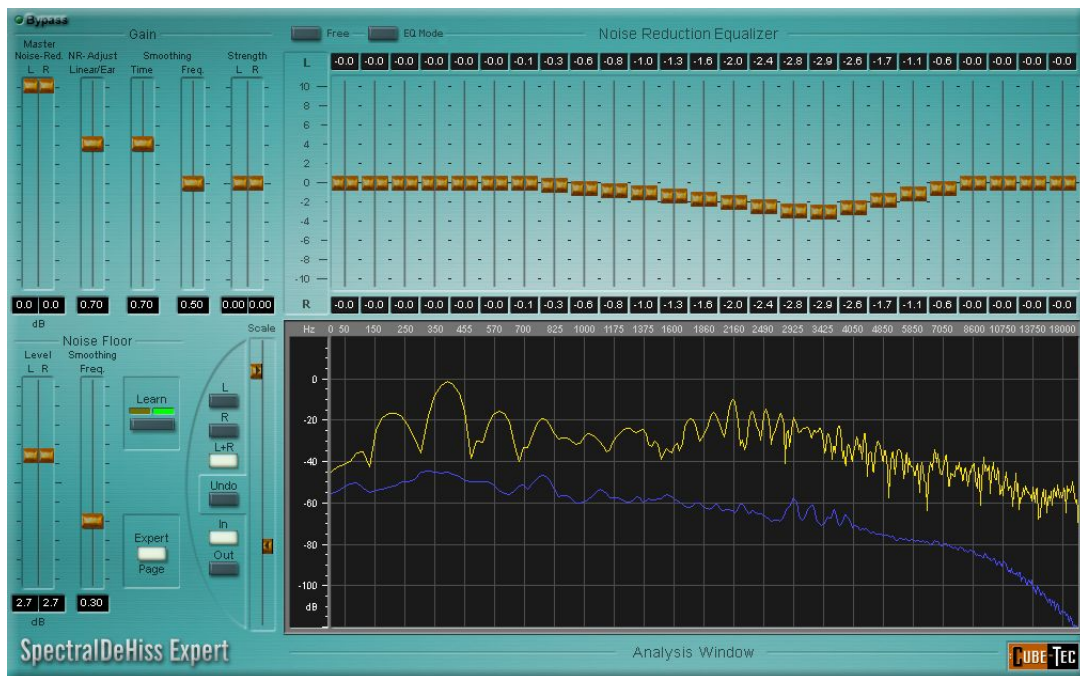


QUICK-START – Cube-Tec SpectralDeHiss Expert for Pro Tools™



SPECTRALDEHISS EXPERT FOR PRO TOOLS™

SpectralDeHiss Expert employs a sophisticated 'fingerprinting' technique whereby the noise floor of a signal is analyzed during real-time program playback – even if the noise floor is not separate from the program. You don't have to look for some isolated noise area, perform an FFT to create a noise estimate. (Like Sonic Solutions No-Noise for example.) From this learned "noise estimate", a filter set is generated, modified by the user and applied to the program audio.

The user interface is split into four sections. The bottom right graph area is used for the analysis of the noise floor and modification of the filter set. Above it is a set of faders that can be used as a macro control for the generated filter set, or as a post enhancement equalizer. The left side is where most of job is performed. The bottom portion contains macro-sliders for setting the over-all noise-floor threshold, and smoothing the noise floor frequency spectrum. The important "Learn" button is in this section, which creates the initial noise profile that the filter set is created from. Above this area (top-left section), are macro-sliders for controlling the filters: the amount of noise reduction, time and frequency domain smoothing functions and more macro controls for manipulating the filter set.

To begin the process, the VPI needs to **learn** the noise floor. Begin playback of some audio. (It's not necessary to take a section of noise-only, because the SpectralDeHiss can automatically differentiate between noise floor and program. However it is important that the noise floor is constantly present, so avoid learning areas with silent passages. (Digital silence) Avoid "learning" passages that contain hum or buzz. Hum or buzz should be removed with the **DeBuZZ** first. Finally, avoid "learning" musical material with static tones, like long standing bass notes, pedal tones, and so on. In that case, look for an area without those tones. Even if it is quite short, simply loop the area.

Press the **Learn** button. The LED should latch yellow and stay yellow until the learning process is over -- usually between 6 - 10 seconds. When learning is completed, the yellow LED will go out, and the green LED will come on. This indicates that a noise signature has been captured, and you can continue with the slider adjustments.

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The overall noise attenuation is performed by the **Noise Reduction** slider. Initially, I generally have this set at -20 dB -- I do this mainly so I can easily hear how changing the parameters are affecting the program and noise floor. Artifacts show up more easily with this amount of attenuation (When you are happy with the settings of the parameters, then you can set this to something more appropriate – if you can get – 10dB of single-ended noise reduction, without sacrificing fidelity, you're doing well.)

The **Gain Smoothing** sliders affect how the filters behave when reacting to program material. **Time** controls the amount of time the filters need to open and close. At 0 this happens very fast, which results in a hard denoising and depending on the program, might introduce ambient/delay artifacts. Generally, I have this fader on the bottom part of the scale -- near zero.

Frequency affects the bandwidth of the filters. At 0 they are very "narrow-notch", moving this up will have broader filters working, which will sound softer and more natural. For this reason, I generally have the **Frequency** slider near the top of the range. If you aren't too concerned about artifacts (for example with some forensic work), you could try lower the settings. In both cases you are compromising between effective and discriminating filtering, with artifact-free processing.

The **NR Adjust Linear/Ear** slider dampens the filters that affect the ear's most sensitive mid-frequency range. (sort-of like an inverse Fletcher-Munson curve.) This will drop the noise floor but on some program material it filters too much of the audio you want to keep. I always check the effect of this slider because on some program it works very well -- on other program it is instantly audible and can really dampen those critical mid-frequencies. (For example, for dialog, it's usually a good idea to leave it "linear")

The **NR Adjust** slider actually manipulates the noise reduction equalizer. This equalizer can be applied to the overall generated filter set either through the **Linear/Ear** slider or in **Free Mode**. The **Free Mode** button allows you to address each of the faders individually. Just remember that this modifies the underlying filter set.

If you want to simply use this section as a linear-phase equalizer, use the **EQ Mode** button. This places the equalizer after the noise-reduction filters. It can be used as a post-processing enhancement EQ to add a bit of sparkle back in without resorting to additional tools. While equalizing, keep an eye on the frequency centers of those filters; the Bark scale is quite a bit different than an ISO based graphic EQ!

The **Level** slider (Noise Floor section) moves the "learned" noise floor up or down, and will have an effect like changing the overall threshold. Positive values result in more denoising, negative values in less. As with the **Master Noise Reduction** slider, I'll increase this a little so that the time/frequency domain artifacts are more pronounced -- then once I set up the Smoothing sliders, I'll drop this down to where it is doing the best job.

The **Noise Floor Smoothing** slider next to the **Level** slider flattens the frequency response of the learned noise estimate, so that it will have fewer spikes and a more "averaged" curve. This make it easier for the filter set to track the noise – once again, to balance noise reduction performance against fidelity. I usually experiment with **Flatness** in the lower ranges of the slider. Although higher values make a smoother curve with fewer artifacts, the noise reduction is compromised. Some experimentation is required for each program sample. Smoothing the frequency spectrum can have a dramatic affect on the overall energy that the filters are tracking. More smoothing means that the noise floor gets dropped below the filter thresholds. You usually have to make a small compensation with the **Noise Floor Level** slider by moving up...

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The **SpectralDeHiss Expert** features an advanced analysis pane and equalizer section. The **Analysis Window** displays the estimated noise floor and can be edited by hand for further optimization. You can change between the display of the input and output spectrum of the signal (**In/Out** buttons) and between the left and right channel (**Left/Right** buttons).

The **Analysis Window** frequency scale is divided into 25 bands, based on the psycho-acoustic optimized Bark scale, optimized for human hearing. For each of these bands the noise reduction can be adjusted for the left and right channel independently. Therefore, the noise reduction can easily be adapted to the special noise profile of the input signal.

Right-clicking on the display shows the noise floor estimate in an “edit” mode. It is possible to literally draw a new estimate by hand. Typically, this is used to slightly push certain areas above or below the program threshold (super-imposed yellow curve during play-back). If you raise areas, there will be more processing – if you lower areas, there will be less processing. I typically use this to perform more reduction in certain noncritical areas and then tweak the overall **Level** slider to compensate. In reality, the noise curve, along with the **Noise Floor Level** and **Smoothing** sliders need to be manipulated interactively.

Presets store all of the VPI’s parameters, plus the learned noise-floor spectrum and any user modifications. If you are working in post-production and might have a similar signature on multiple sound files (or even TV episodes), it’s a good idea to save your presets and properly identify the type of noise it was used for.

Operators should be aware, that as a single-ended noise reduction system, they should carefully monitor program material throughout processing, and that A/B comparisons of inserting/bypassing the VPI are important to ensure minimum loss on the part of the program that we want to keep!

As in any signal processing, judicious use of the tool and a sensitive ear in maintaining the integrity of the original program is as important as the tools that are actually doing the job.

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