

March 15, 2018

VRC Easy Spread n' Peel, vinyl record cleaning film

I'm an audio professional who specializes in audio editing, preservation and restoration, audio forensics, and audio sciences. So to make me a believer in an audio product, I need to be extra discriminatory as to what's happening on a microscopic level. I need to cut through the marketing jargon, and get down to brass tacks. My experience with VRC's Easy Spread n' Peel has left me quite astounded, so I'd like to share some interesting findings with you. Sometimes the best way to see how a product works is to actually see it work. I was given the task by ESP's owner and creator, Stephen, to somehow quantify the results of ESP's cleaning method. I was given a fantastic product demonstration via Skype, and a few audio files to discriminate. We also had the pleasure of discussing some of the scientific aspects of what is really happening during the manufacturing process, aging process, and cleaning process. My findings were true, absolute, and unquestionable, that the ESP system is undoubtedly one of the best products I've seen.

In the spirit of preservation, we need to be absolutely sure that the product that is entrusted to clean and preserve our audio isn't damaging the original media. I've seen, and used, other vinyl cleaning systems ranging from expensive scrubbing contraptions, to the old 'hand me down' methods of cleaning using off the shelf substances. I can safely say that due to the nature of how those products work there is a certain level of degradation or damage to the original media after the cleaning has taken place. This is caused by the type of chemical substances used where residues linger on the surface of the vinyl which may lead to breakdown of the vinyl over time. Or it can happen by the mechanical removal of so-called "crud" using a manual cleaning method.

While "crud" can certainly be removed by these methods, so can vital high frequency information that gives us the true analog listening experience. To understand this, it's important to understand how a record works.

Media

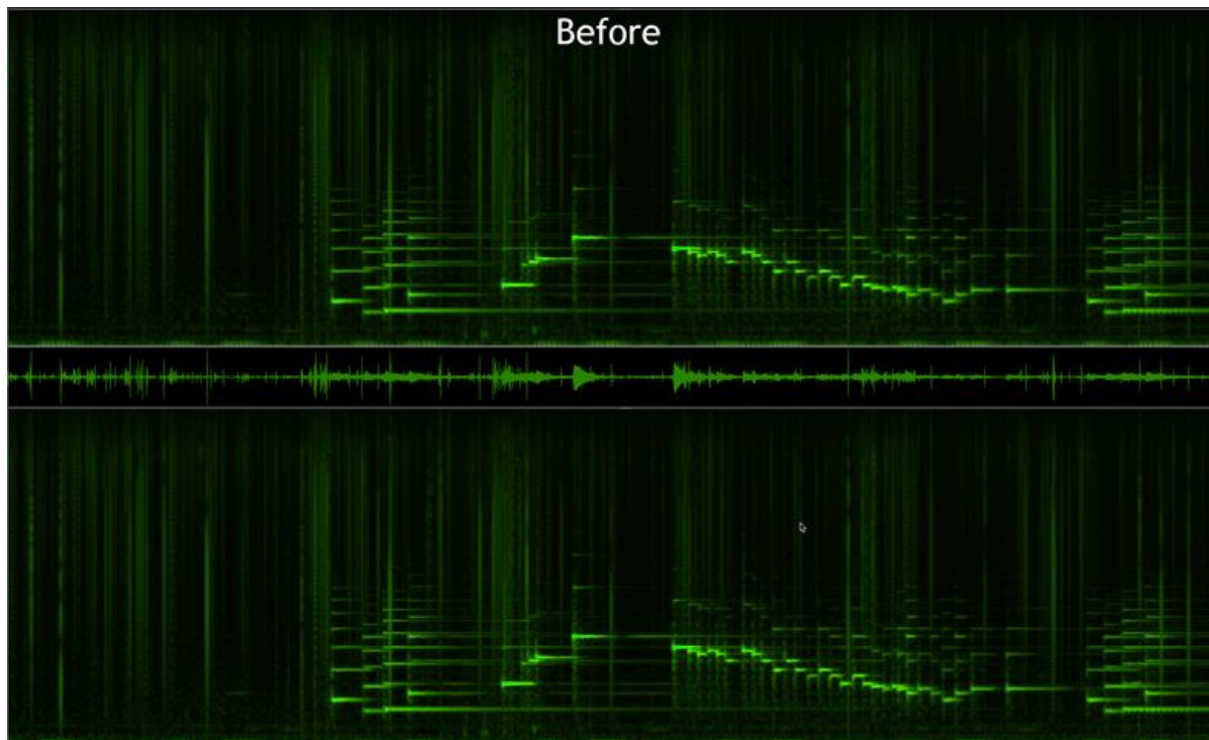
How it works is simple. It's similar to the age old 'wood glue' method, by spreading ESP on the surface of the vinyl, and lifting off the remnants. However, it does this with the utmost consideration to the physics of a vinyl record, and without leaving any chemical residue behind, or without causing any damage to the original media. In fact, Stephen at VRC has quantified that not only does it remove decades of particles, tar from cigarette smoke, "diamond dust" left from the breakdown of the record stylus, but with multiple cleanings it can remove even the original molding residue left from the manufacturing process.

Here are some of the audio files to show the before, and after. But how can we hear ONLY the 'crud' that ESP so elegantly removes? That's where I come in, and it was much more challenging than I originally anticipated. The ESP cleaning process, was affecting some things

that I hadn't previously thought of, which essentially effects how I'm able to extract this information from the recordings.

Here we have Example A which is a simple A/B test before and after being cleaned by ESP. What you are seeing is a spectral analysis of the audio. The brighter colors reflect the intensity of the sound.

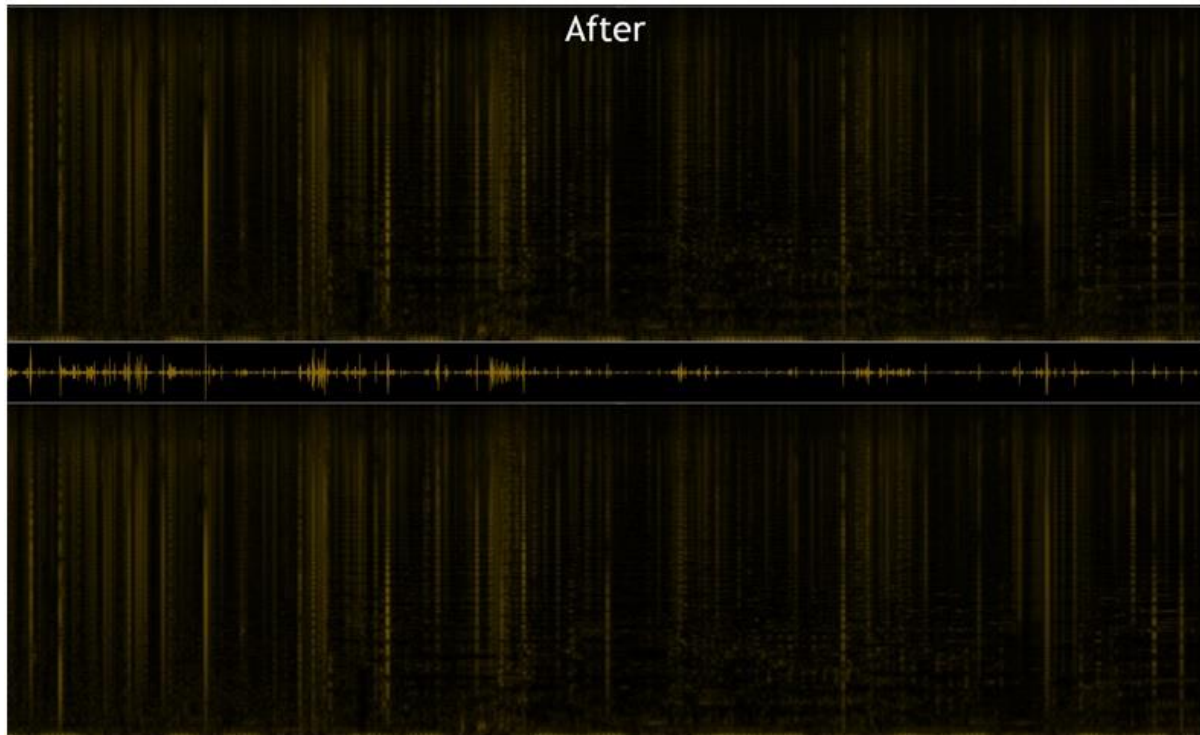
We can see the original piano notes, but also the "crud" that is getting removed.



In this visual example it is fascinating to note a few things that you may not hear on your first listen, but can clearly see. There are no "pits" or holes left over in the audio data where the 'crud' was removed. All of the musical information is retained, even in the upper harmonics. This means that there is no destruction of even the most sensitive parts of the vinyl. You can also see that the musical material looks brighter and stronger after cleaning. So the original musical material that you weren't hearing before has resurfaced. This comes from the stylus being able to sit deeper in the groove and become more reactive to the grooves. You will also see at the beginning of the notes there is much more intensity vertically. This results in the restoration of audio transients and dynamic range. This will give you a deeper sense of accuracy and realism. In the cleaned version, you can clearly hear the hammer of the piano striking the note, which is difficult to hear in the dirty version.

Example B is where I came in to do the spectral differencing. This time, we can see ONLY the crud that has been removed. This is not just as simple as removing

musical data, because we still needed to get the difference of the noise. To achieve this, I needed to take a spectral difference of the dirty vs cleaned example, which separates the natural noise in the recording from the noise created by the 'crud'. Once I had that, I needed to extrapolate the noise and remove any musical artifacting left over as the result of an interesting unforeseen phenomenon that I will describe later. What we are left with is just the pure noise that the ESP system removes from the recording.



Example B - Isolated Noise

So you can hear how much 'crud' we're actually lifting off the surface with the ESP product, with no musical remnants!

Previously, I touched on a few things that made this result difficult to achieve. In the digital audio world, we rely heavily on material that is exact in the time and frequency domain. When working with analog media like tapes or vinyl, time and frequency are affected by playback speed. Old media is often troubled by what we call 'wow and flutter'. As the playback speed fluctuates, the speed and pitch of the media change. While this data is certainly quantifiable, it would take thousands of dollars of equipment and software to even come up with a simple percentage of improvement, at least in the digital domain. In the analog domain, we rely on counters and strobes to do the work for us. So without a vinyl test medium, and the proper hardware and software, it would be virtually impossible to figure out the exact numbers.

Luckily I was able to visualize the effects of these wow and utter improvements down to the millisecond using my specialized software. Piano notes had certain levels of "vibrato" which were completely removed. What I found was that some of the 'crud' on the recording, actually slowed down the playback speed, lowered the pitch, and sometimes caused the stylus to skip.

We're not talking about the obvious skips though, we're in milliseconds territory. When this happens, your stylus can break down over time, creating "diamond dust" that also sits in the grooves of your beloved vinyl. The turntable motor wears faster, and in our case where a direct drive turntable was used, can cause the stylus to get caught on this crud and allow the vinyl to skid on the platter. This eventually leads to a mechanical breakdown of the vinyl over time, which cannot be restored.

In the end, I averaged the amount of noise over time, and took percentages of each recording. We ended up with an 11db increase in overall signal to noise ratio, which is around a 75% improvement in how it sounds to the logarithmic way that humans hear sound, and an 8db improvement to the peak noise floor, which is over 50%. I stand behind my measurements and say with confidence that ESP is a superior product that I would put my stamp of approval on, and entrust my entire vinyl collection to for years to come. While we can't reverse the effects of aging, we can certainly control them, and ESP is the only way I'd recommend to any audiophile.

-Dave Askew