

DS Audio

Development Story

SC-001

SONIC CLEANING BRUSH

A market with only two options

For a long time, cleaning a record meant choosing between two things: a simple brush costing a few dollars, or an expensive ultrasonic cleaning machine.

The brush is convenient, but limited in what it can do. The machine works — yet its price, the space it demands, and the time it takes to finish a single record put it beyond something you would reach for every time you pull out an album. Easy enough for daily use, and genuinely effective. Nothing on the market satisfied both.

More effective than a simple brush. Easier than an ultrasonic machine.

That space was empty not because nobody needed it, but because nobody had filled it. The SC-001 did not begin with a product idea. It began with confirming that.

An electric toothbrush for records

The turning point came from an unlikely place. The toothbrush.

Toothbrushes used to be something you moved by hand. Today most people use an electric one, for a simple reason: it cleans better. A fine, rapid vibration reaches where the back-and-forth motion of a hand cannot. The moment the tool itself began to move, the quality of cleaning changed.

Records are no different. As long as the brush is moved by hand, the bristles only trace the surface of the groove; they cannot physically reach the dust settled deep inside. If you want them to reach, the brush itself has to move.

Not an improvement, but a change of premise. The SC-001 began from that single line.

Nobody was showing their evidence

Before development began, we examined every record brush we could find on the market. One thing became clear: almost none of them showed any basis for their performance.

Why this bristle material? Why is this brush good? We could not find an explanation that went into the reasons. The word good was there. The numbers behind it were not.

They say it is good. Nowhere do they say why.

We do not take this as negligence. The reason is straightforward: quantifying a dust removal rate is genuinely difficult. The fine dust remaining on a record surface is barely visible to the eye. What cannot be seen cannot be counted, and what cannot be counted cannot be compared. So it could only be spoken of in the language of feel and experience.

Even so, we wanted what we made to rest on evidence — to stand on numbers. The moment we refused to give that up, this wall became something we could not go around.

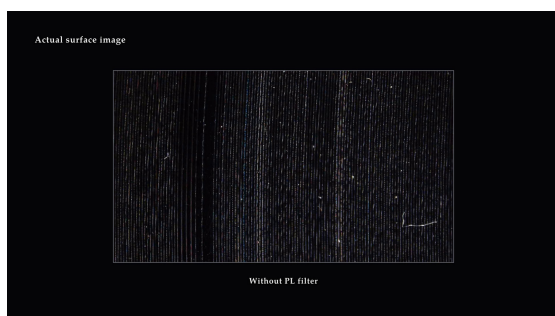
Counting what cannot be seen

We tried a number of approaches to quantification. Scattering powder as a stand-in for dust and measuring how much was collected. Peering into the groove under a microscope and comparing photographs taken before and after cleaning.

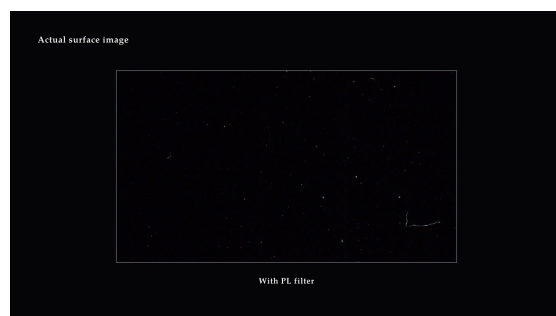
All of them produce results that look plausible. But the conditions were hard to hold constant, and subjectivity crept into the final judgment. The numbers came out, and we could not bring ourselves to trust them. That went on for some time.

The answer was not a better way to measure, but a change in how the record itself is seen. A polarizing filter.

The surface of a record reflects light well, and that reflection was precisely what had been hiding the fine dust. The moment we suppressed the unwanted reflection with a filter, the dust alone rose into view on the microscope camera.



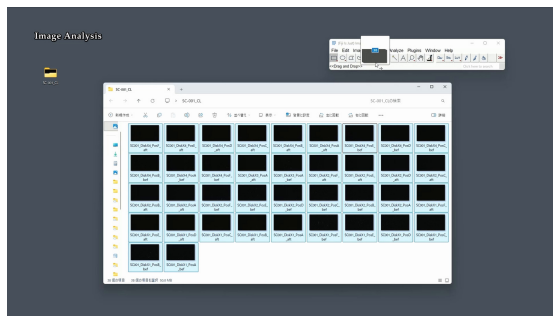
BEFORE Dust buried in reflected light



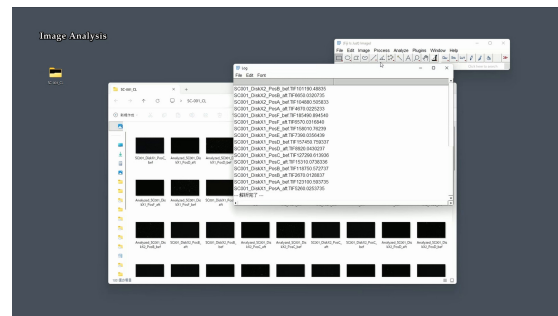
AFTER Dust alone rises into view

First, make it visible. Choosing comes after.

What rises into view can be counted as area through image analysis. Only then could we compare the residue before and after cleaning under identical conditions, with no subjectivity in between. Using this method, we tested candidate bristle materials one by one.



RECORD Before and after, captured at the same position



ANALYSIS Image analysis calculates dust as area

This may come as a surprise. **Changing the bristle material alone changes the dust removal rate dramatically.** Materials that feel almost identical in the hand ranged from removing only twenty-odd percent to removing more than eighty. The size of that gap surprised us more than anyone.

Touch alone will never tell you. Without these experiments, we would never have arrived at the material we use today.

The finished SC-001 showed an average dust removal rate of **84%** across a series of measurements. Roughly **1,000** data points stand behind that figure.

The other enemy: static

Static electricity on records is something we have worked on for a long time. When we measured the actual charge on products described as anti-static brushes, we found that they could reduce static, but almost none could eliminate it. That is why we make the ION-001 ionizer, a dedicated device for that one task.

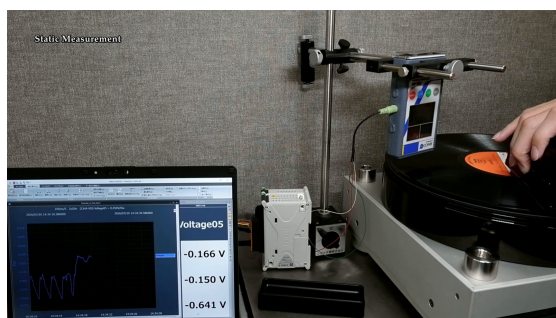
But if we were going to make a brush, we wanted to suppress the charge before removing it.

Here lies an awkward contradiction. Static is born of friction and contact, which means the very act of brushing a record becomes a source of it. As long as the structure generates while it removes, no amount of discharging behind the brush will take away everything.

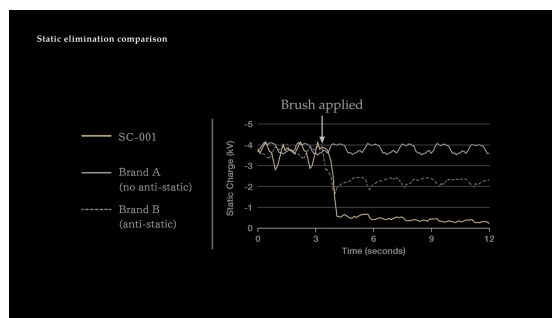
Rather than removing what you generate, do not generate it.

The answer was in the bristle material. Choose a material that sits extremely close to vinyl on the triboelectric series, and almost no charge transfers on contact. The bristles themselves barely generate static. This material, too, was chosen on the basis of measured charge.

Low-static fiber suppresses generation; conductive fiber placed behind the vibrating head carries away the charge already present. Suppress first, then remove. With this order, a surface measured at roughly -4kV dropped to nearly 0kV simply by applying the brush.



TEST Applying the brush to a charged record and tracking surface potential



RESULT Change in surface potential (SC-001 / two competitor brushes)

Sonic, not ultrasonic

The SC-001 is the world's first* sonic vibration cleaning brush for vinyl records. A compact motor inside vibrates the brush itself approximately **11,000** times per minute, lifting dust from deep within the groove. That frequency lies within the range of human hearing. It is not ultrasonic. This is why the name carries Sonic.

And the vibration is not there to scrape the groove. It is a motion that floats the dust and lifts it away. The amplitude is minute, the bristles are soft, and the brush only touches the record lightly. Compared with wiping by hand under pressure, the load on the surface is, if anything, smaller.

More effective than a simple brush. Easier than an ultrasonic machine. The SC-001 gave form to the line we set down at the start. Finding the gap in the market, building our own way to measure, choosing materials by numbers, resolving the contradiction of static — all of it was for that one line.

The stylus descends onto the record. Before that instant, the sound has already begun to be decided. What remains in the groove. What the disc is carrying. The SC-001 is a tool for the moment before.

* Per DS Audio's research. Figures in this document are measured values under DS Audio's test conditions. Results vary with usage environment and record condition.

Music begins
before the stylus drops.

SC-001 SONIC CLEANING BRUSH

DS Audio

Creating the Future of Analog Music

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