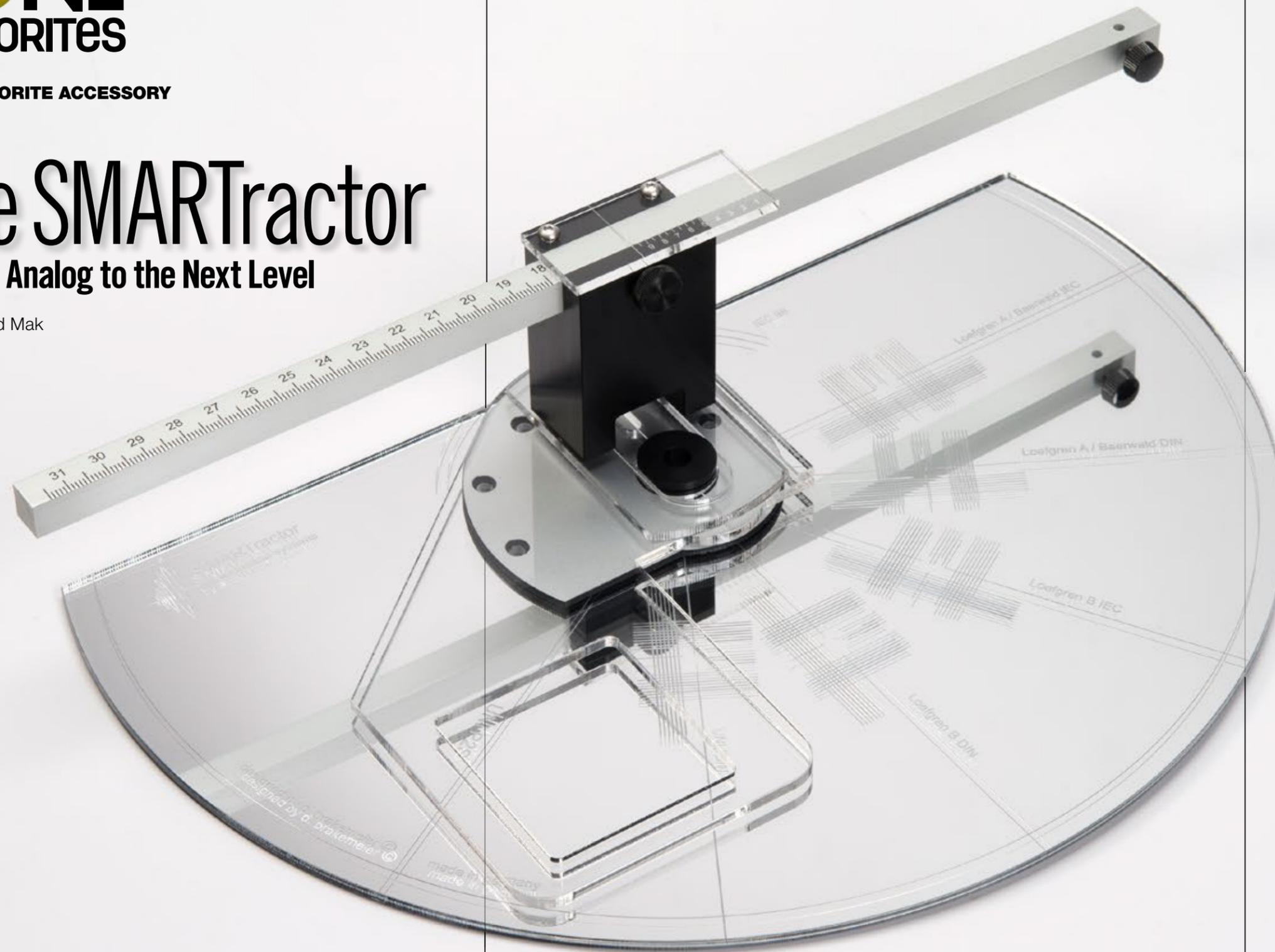


TONE FAVORITES

OUR FAVORITE ACCESSORY

The SMARTractor Taking Analog to the Next Level

By Richard Mak



While tremendous advances have been made in turntable and phono-cartridge design since the introduction of the LP 66 years ago, there remains more music to be found in those vinyl grooves. We now have cartridges with dynamic range and stylus profiles unheard of back then, yet we continue to optimize our turntables with tools from the 1950s. In 2013, Dietrich Brakemeier of Acoustical Systems from Germany found a way to bring us into the 21st century, with a cartridge-alignment tool called the SMARTractor.

The development of the SMARTractor began with an earlier, more expensive alignment tool called the Uni-Protractor (\$795), which Brakemeier created in 2010 as a result of research and development on his proprietary UNI-DIN alignment geometry. His aim was to improve upon the traditional Baerwald and Lofgren alignment geometry used for non-tangential tonearms, along with a separate tool to accurately handle pivot-to-spindle distance. In 2013, VANA Ltd., Acoustic Systems' North American distributor, managed to convince Brakemeier to combine the two tools into one. That product is the SMARTractor, priced at \$650.

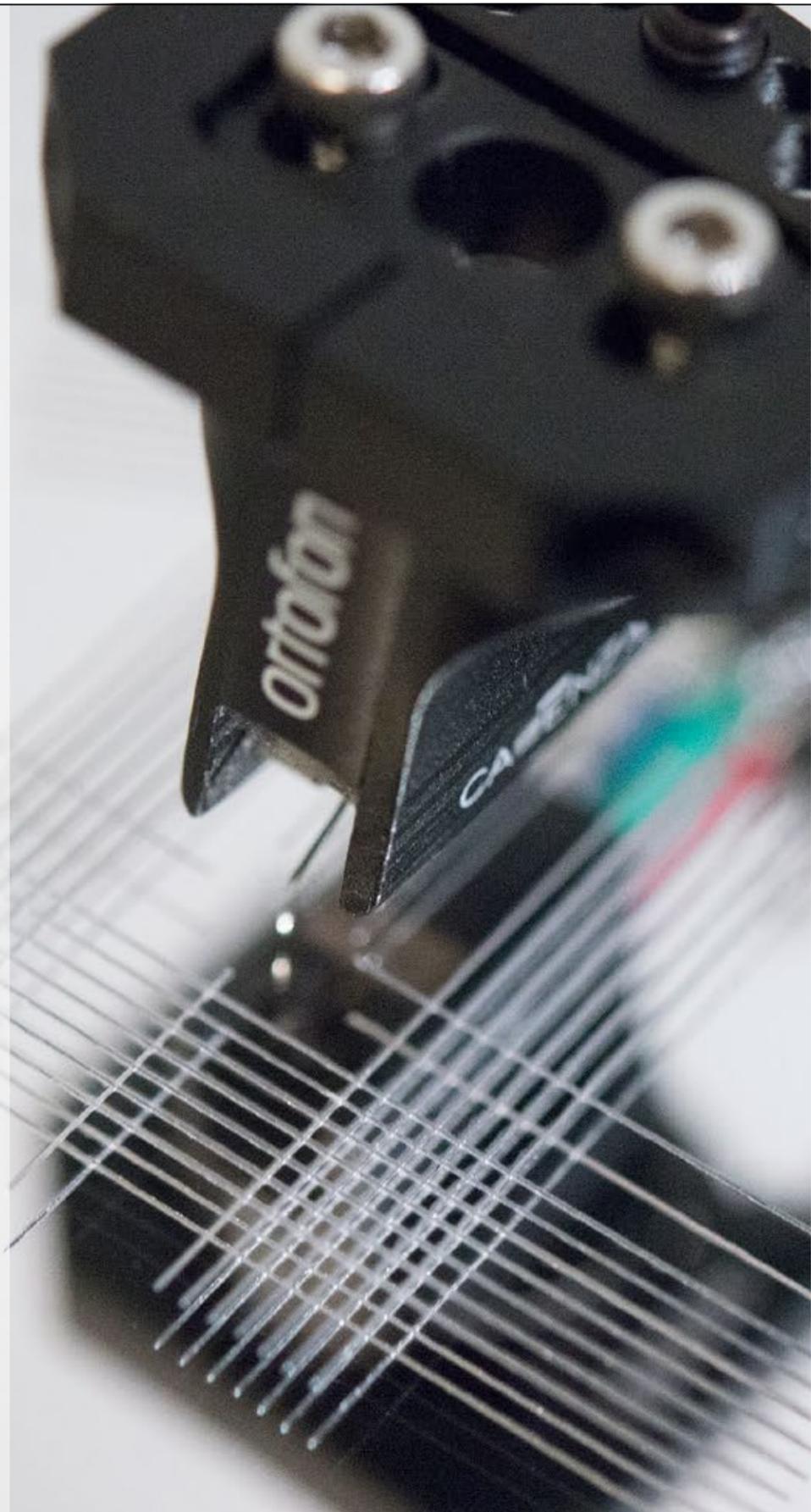
In my opinion, the SMARTractor is the most precise and user-friendly universal cartridge-alignment tool on the market today. As one of the first beta testers of the SMARTractor, I have used this tool to successfully set up hundreds of turntables for friends, family and other analog enthusiasts. In doing so, I have identified four compelling features that take precise cartridge alignment to a level previously unattainable—and taking analog enjoyment to an equally enthralling level.

Pivot-to-Spindle Accuracy

The first step in any analog setup involves setting the pivot center of the tonearm at a specific position relative to the spindle as specified by the factory. This is called the pivot-to-spindle distance. Some tonearm manufacturers provide a rudimentary tool to perform this alignment, while others do not. The SMARTractor leaves nothing to chance.

Using the provided alignment jig or a simple ruler, you measure the mounting distance of the tonearm pivot. But you will only be able to get within 1 to 2 mm of accuracy and, taking slight variations of spindle size into account, this measurement could actually be off quite a bit. In the microscopic world of record grooves, where the distance between groove walls is no more than 2 to 3 micrometers, a 1 mm deviation is practically the size of a football field.

The SMARTractor improves pivot-to-spindle accuracy in two ways: It takes into account variation in spindle sizes by providing three spindle adapters to ensure the tool is mounted onto your spindle with a precise fit, eliminating playback errors; and distance accuracy is further improved by incorporating a vernier scale on the extendable distance-measuring arm, which is accurate to within 5/100 of a millimeter. (Detailed instructions are provided on page 8 of the concise owner's manual, for those not familiar with this method of measurement.)



With the measuring arm extended at the precise distance specified by the manufacturer, you insert the metal pin into the SMARTractor's measuring beam, aiming it directly at the tonearm pivot to find the proper mounting position. Some manufacturers are smart enough to provide an indentation on top of the pivot to identify this location, but for those that don't, the SMARTractor comes with a transparent circular disc with printed gridlines to identify the proper location of the tonearm pivot. The tightened tolerance of each of these steps translates into a much higher level of measuring precision for proper positioning of the tonearm pivot than was previously available with other tools.

Null-Point Accuracy

The next step is to move the position of the cartridge into the spot on the headshell where the cantilever stylus will land on the null point of the chosen mounting geometry. These null points are usually a printed dot on the templates, ranging in size from 0.5 mm to 1 mm. The SMARTractor's null point is a cone-shaped indentation cut onto the template with a laser; the size of the indentation is smaller than the actual stylus so that only the very tip of a stylus can fit into the spot, which is barely visible to the naked eye. The stylus either fits into the SMARTractor's indentation or it won't, with unprecedented single-point accuracy.

Two words of caution: Users should always set the vertical-tracking force (VTF) to the factory

recommendation before making any attempts at landing the stylus; if VTF is set too high, by the end of your session, you will have damaged the suspension of the cantilever. Secondly, be sure the turntable platter is secure to avoid any movement before you begin measurements, as the stylus will be ripped from the cantilever should unexpected rotation occur!

Parallax Distortion Eliminated

When the relative location of the stylus in relation to the null point has been determined, the next step is to rotate the cartridge body so that the cantilever, not the cartridge body, is perfectly parallel to the gridlines printed on the template. Herein lies the problem of parallax distortions associated with nearly all the tools found on the market. The SMARTractor improves upon this method by providing gridlines that are much longer and narrower, greatly improving visibility and accuracy.

For cartridge cantilevers hidden well into their body, such as the Kondo IO-M, a small magnifying glass is provided with SMARTractor. For the optically challenged, Acoustical Systems does offer the UNI-Scope (\$349), an electronic microscope designed to fit onto your UNI-Tractor or SMARTractor. It magnifies the stylus image to approximately 220 times the original size and displays the enlarged image on your computer screen via USB. Your kids can also enjoy the Uni-Scope, magnifying insects and such to 200 times their size.

Five Alignment Geometries

The SMARTractor offers five different curves to align any cartridge and tonearm combination: Loefgren; Baerwald IEC, Loefgren A; Baerwald DIN, Loefgren B IEC; Loefgren B DIN; and last but not least, Brakemeier's own UNI-DIN geometry. You can engage the geometry you prefer by positioning the corresponding choice into place, securing it with the locking screw on the tool. (Again, everything is well explained in the owner's manual.)

While it is beyond the scope of this review to discuss the merits of each set of geometry, my interview with Brakemeier offered some insights to his UNI-DIN geometry. He feels that the two popular geometries (Loefgren and Baerwald), which most users are familiar with, were developed before World War II for the 78s record format, which has less complex grooves than today's records and are tracked at 20 to 30 grams with styli that are 20 to 50 times the size of a modern stereo stylus. Both Baerwald and Loefgren are calculating tangential curves based on the lowest possible average distortion as well as lowest maximum deviation from the zero tangential point, with the goal of achieving a mixture of the lowest possible distortion and trackability over an assumed linear groove.

However, modern-day records have much tighter grooves. The beginning of a record has an approximately 100 cm groove length per revolution, versus only 36.1 cm at the inner groove (according to the DIN standard). *(continued)*

While speed has remained constant, the working condition of the stylus is non-linear, making today's styli work much harder; nearly 3 times harder as it approaches the inner label, an important factor that only the UNI-DIN geometry takes into account. UNI-DIN trades higher distortions in the tangential curve at the beginning of the record/groove for lower distortions in the last 70 percent.

In comparison, UNI-DIN offers lower overall distortion than Baerwald, Loefgren or Stevenson, and explains why the result feels so much more open and transparent. The human ear is highly sensitive to quick changes in distortion levels, and once the cartridge is aligned to UNI-DIN, you will immediately notice the difference.

Brakemeier does not go so far as to claim that his UNI-DIN geometry is the best, but he does encourage serious audiophiles to investigate. His geometry offers a more relaxed sound with less sibilance, while offering more headroom for dynamics.

Uni-Protractor or SMARTractor?

At nearly double the price, the combined UNI-Protractor and pivot-to-spindle tool is the big brother to the SMARTractor. Brakemeier calls it the heavy-duty professional version. It features more metal parts and interchangeable templates with tonearm-specific geometries, and it is only available on special order. While the mirror-like surface of the SMARTractor

alignment template may look like glass, it is actually polycarbonate, which can be scratched by the diamond of the stylus tip. Over time, such scratches will render the template unusable, so the interchangeability is an added advantage of the more expensive unit. With the high number of alignments I've clocked on the UNI-Protractor, I've managed to wear down three templates, so for someone like a dealer who will be setting up a lot of turntables, the UNI-Protractor may be the best choice. For everyone else, the SMARTractor will be sufficient, as most people will likely perform less than 50 alignments in their lifetime.

In the audio world, where Goldfinger cartridges can cost more than cars yet full ghetto-blasters can cost less than a SMARTractor, I'll leave economic analysis out of the equation. But as a music lover and an analogaholic who performs more than 200 to 300 setups per year, I will say that the SMARTractor has proven itself to be an indispensable tool. If you are like me and gunning for analog perfection, the SMARTractor is a must buy. ●

The SMARTractor
\$650

www.arche-headshell.de
(manufacturer)

www.vanaltd.com
(North American distributor)

