

# Of three musketeers and extreme mechanical engineering

A visit to Rainer Horstmann

If one were to imagine the creator of the „most expensive record player in the world“ without prior knowledge, it would not match to the real person Rainer Horstmann at all. Because the extremely amiable, modest tinkerer and skilled mechanic had originally only mentioned the price often quoted on the internet for his most ambitious work “Dereneville VPM-2010” in order to get rid of the pressure from the public and to continue working on it in all serenity.

There are people who are already sympathetic to you because of the things you have heard about them even before you meet them. Rainer Horstmann, born in 1950, belongs to this special type of people. Arrogance, secretiveness, or even just bias towards a fellow-man, who enthusiastically listens to music from the record, but has never seriously stood at a milling machine or a lathe, or has drawn up a technical diagram, are completely alien to him. His basic virtues are (guest-) friendliness, courtesy and openness. Horstmann is by no means a non-committal tinkerer, who only does things for fun. After all, over the last seven or eight years, he has invested a considerable portion of his private financial assets into the pursuit of his goal of achieving the best possible analogue vinyl reproduction, while living mainly from a rather small pension. He received significant support from his life companion Irene Dereneville, who not only provided her family name as a brand name, but also left her husband half of her double garage as a workshop. However, the investment should now start to pay back and the signs for this are quite positive. The “Dereneville-Magic-Mat”, a record platter mat made of 0.4 millimeters of silicone around a glassfiber core, which sells very well at home and abroad, and the

clever, computer adjustable turntable motor unit “DAE-01 SP” are now the first commercial products available. At the HIGH END 2016 audio fair, the production version of his new flagship project, the tangential tone arm “Dereneville DTT-02” had its official premiere on the drive of his colleague and competitor, Holger Wilhelm from company Tonetool.

As it is often the case, Horstmann’s work with music and sound engineering had already begun at his youth days. Born in Germany’s city of Gütersloh in rather simple circumstances, there were only few toys for the young Rainer. That is why he used to make a lot himself from early on. He began to build loudspeakers and worked as a drummer in a band. In 1978, Horstmann, who had already completed university and achieved a mechanical engineering degree, then set up his first hobby recording studio in the cellar of the parental home, creating sounds for slide shows, editing concert recordings and producing music cassettes. It did not take too long before he also did his first LP production. In 1981 his LP of the „Gütersloher Nachtsanggeläut“ (which represents skilfully played and meticulously recorded gigantic church bells based on a medieval composition) sold 1200 pieces in only six weeks. Other



productions were commissioned by churches, choirs and bands. The hobby then turned into a profession. In 1982, Rainer Horstmann built a large sound and film studio on 900 square meters. The recording room alone was 150 square meters, at a height of 5.5 meters. In the following about one and a half decades there were about 500 image- and industrial films, for which he almost always wrote the script himself. In addition, there were around 100 radio and TV commercials and another 10 music albums. In 1990, the „Gütersloher Nachtsangeläut“ was put on CD for the first time with organ and wind choirs. A piece of it is also perpetuated on the

well-known audiophile demonstration CD and LP „Music from another star“ issued by German high end loudspeaker manufacturer Manger.

In 1999, the now very successful entrepreneur was hit by a fatal blow: Horstmann suffered from a severe disc prolepsis, resulting in total working disability for over a year. He then decided to sell his large studio complex to a successor while Horstmann continued to support him in a customer consultant role in the film and television industry. In 2002, he discovered a newly issued „magazine for analogue HiFi and vinyl culture“ called „LP“ in a kiosk. He realized that vinyl records and ana-





Top left: A laser system continually checks the 90-degree angle of the tone arm to the record groove

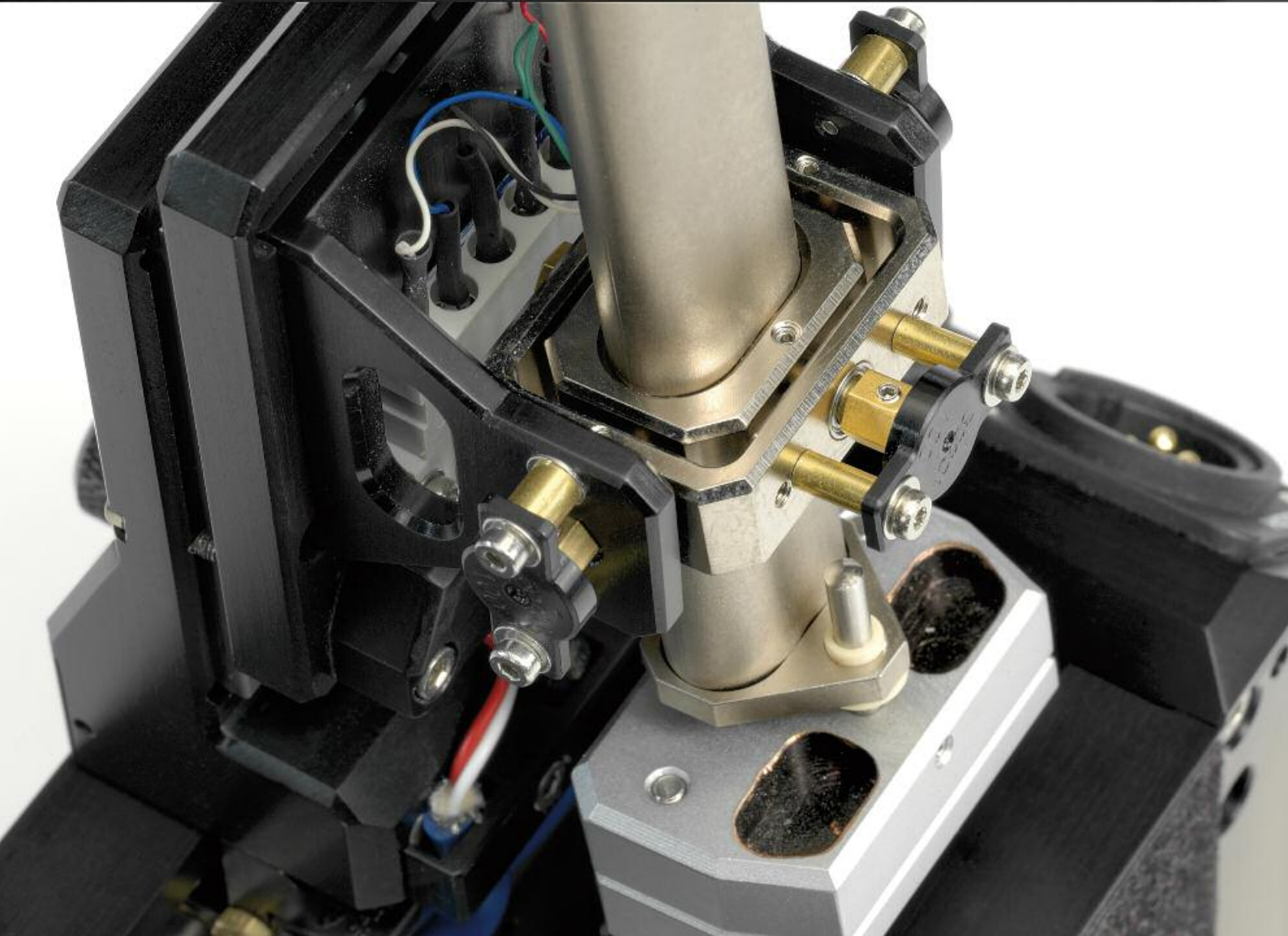
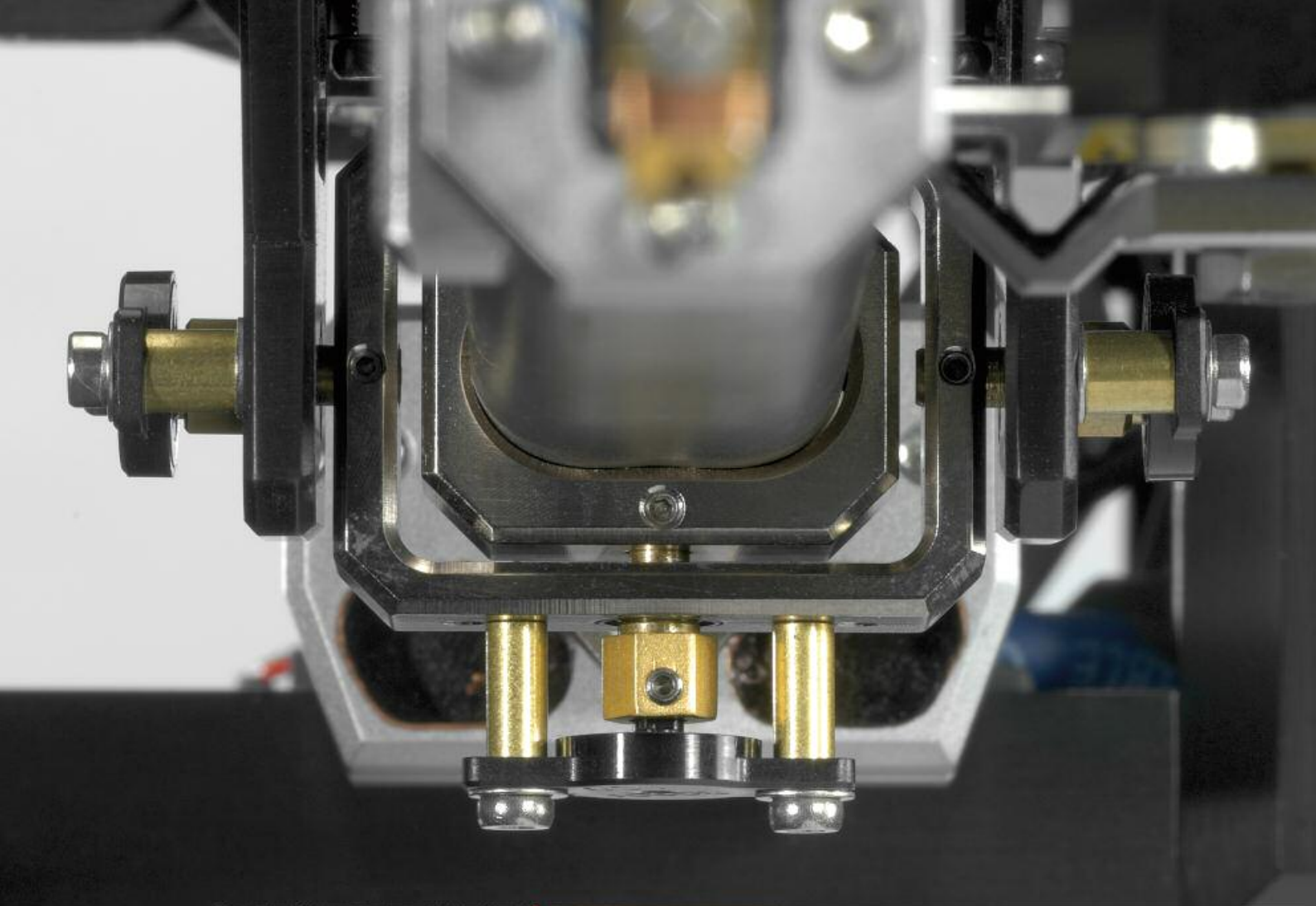
Left: The 'cueing' of the otherwise fully automatic tangential tone arm can be performed by means of a large rotary knob. A display next to it informs about the operating condition

Bottom: Like precision robots in the mechanical industry: side view of the tone arm

Above: Besides the in-house tangential tone arm, the drive also allows for several conventional radial tone arms

Top right: Also, the connecting material is on the level of the highest industrial standard (for industry purposes, not for low-grade consumer products)





logue record players were still „in fashion“ at least in a certain segment, and that even new recordings, tone arms and cartridges were developed with considerable effort. „At first I thought that there was a mistake in the listed prices and that an erroneous additional „zero“ digit had been accidentally added behind the actual amount,“ recalls Rainer Horstmann. Soon, however, it became clear to him that such prices were indeed called and paid for in order to explore the limits of analogue record reproduction. Slowly, he developed a desire to design a new, really good turntable on his own.

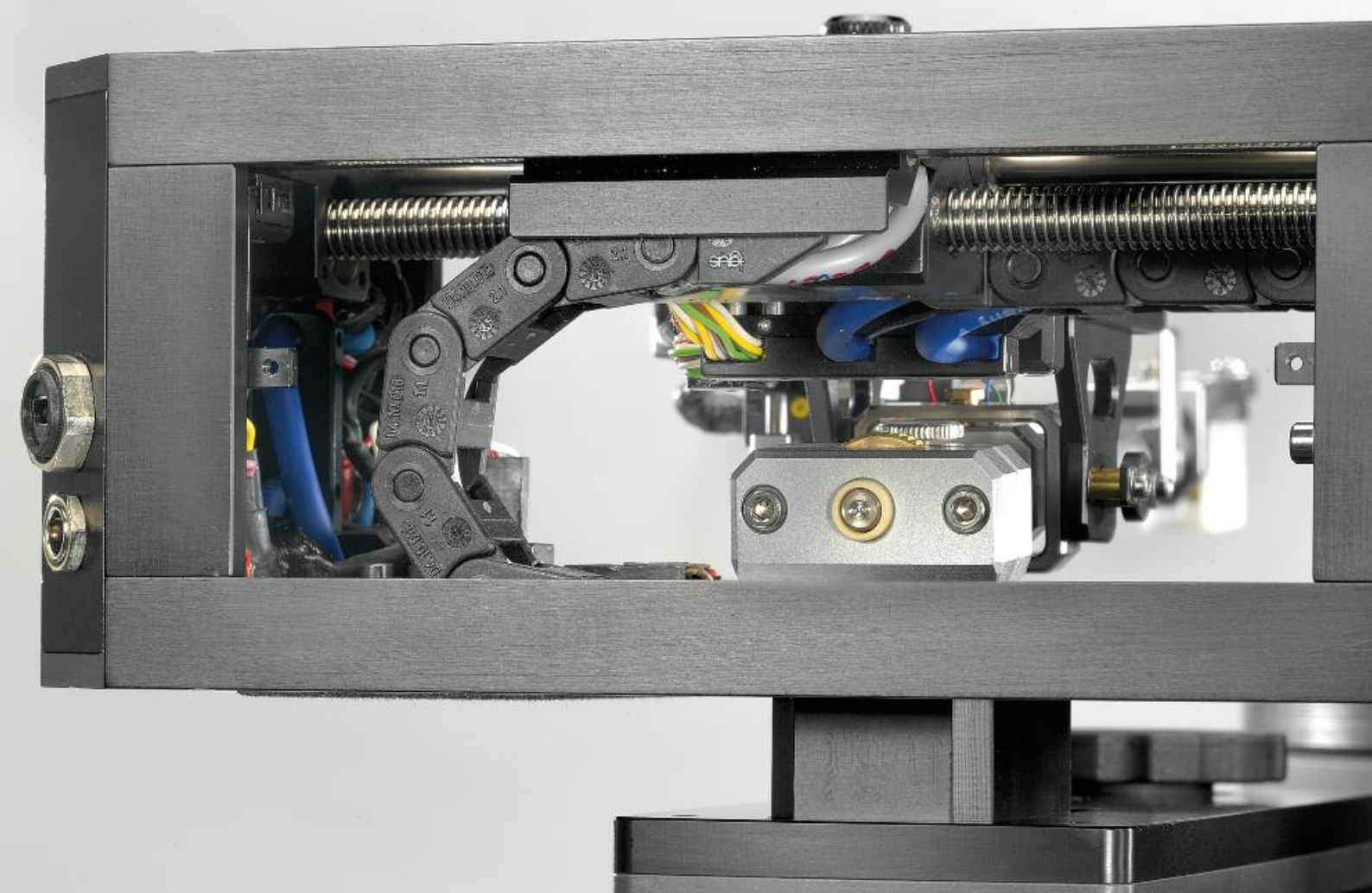
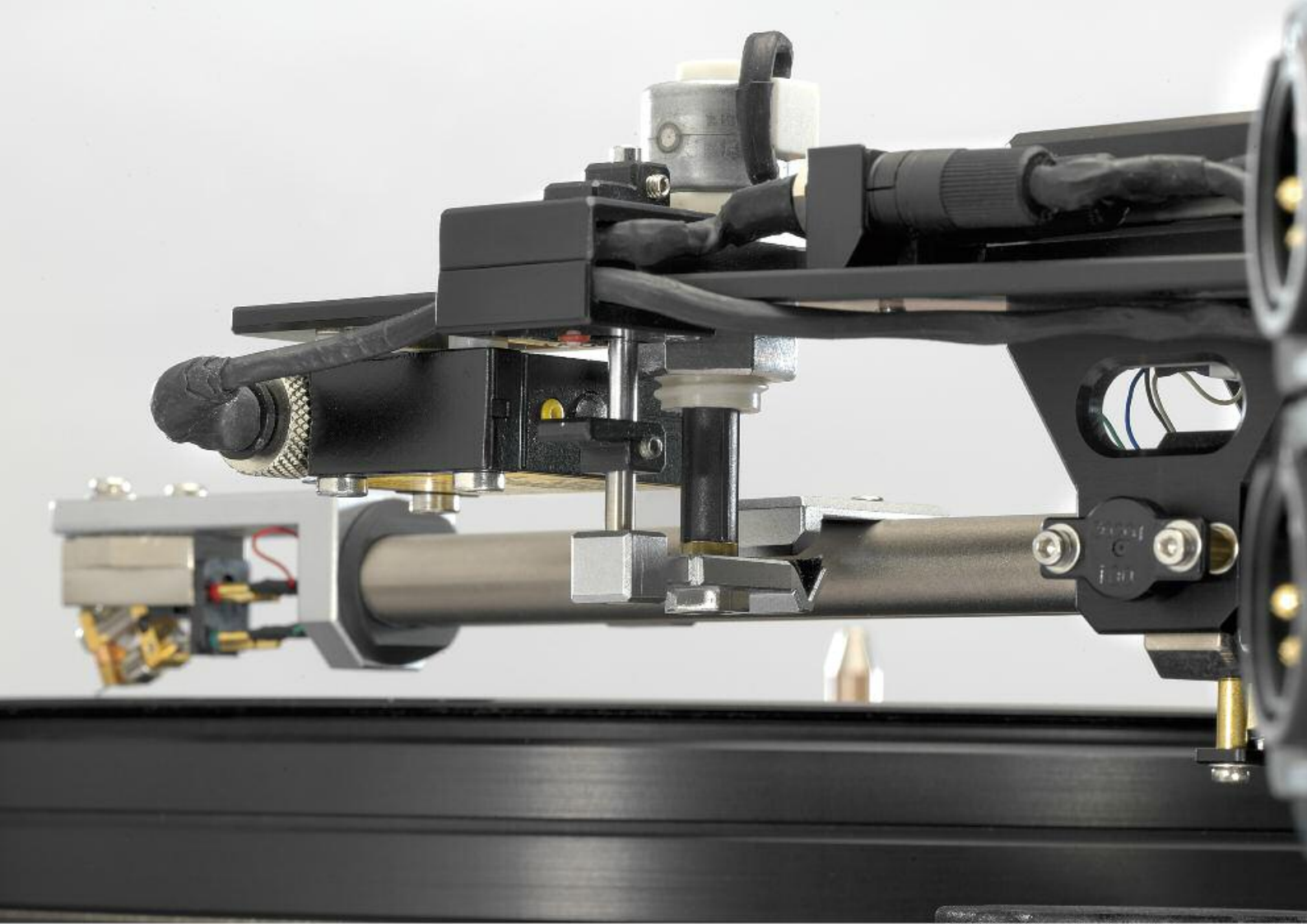
In 2007, Horstmann moved to Lippstadt into a new house together with his new life companion. The ideal space conditions in the new domicile supported him in realizing his idea of building a record player. In 2009, a 1974 „Deckel-FP2“ tool milling machine with a retrofitted digital control and measuring device was purchased and installed in the small workshop in the domestic double garage. Now the technical construction of his first record player, the now famous „Derenville VPM-2010“, proceeded rapidly. However, it was necessary to „breathe life“ into the new no-compromise drive and the corresponding tangential tone arm, because Horstmann knew less in the area of complex electronic control systems. It came in handy that Lippstadt has always been the home of company „Hella“, one of the major suppliers and developers for the automotive

industry in the field of vehicle electronics. With Johannes Gremme and Dr. Hans-Bernhard Bröcker the project won two highly skilled and enthusiastic contributors, who helped to teach the big drive to run. Since then, the two of them have often come by over the weekends to develop, test and build together with Horstmann. The two electronic engineers also make possible that special high quality and high precision electronic components can be used which otherwise would either not be available at all to a „single fighter“ such as Horstmann or only at an unpayable price.

In the fall of 2011, the first Derenville turntable was presented at the „Analogue Forum“, which is an annual event held by the German „Analogue Audio Association“ at the Mercure Hotel in Krefeld. As expected, considering the truly unique effort, the response was tremendous, even if the aesthetics of the drive base with its combination of blue Corian and various brass or gold-colored inserts did not suit everyone's taste. However, the visual design was most probably the last thing the „three musketeers“ had considered in their urge for technical perfection. The 60 kg Chassis was isolated from the outside world by means of four air-cushioned legs. The sense and purpose of the camera monitoring for the pickup needle - as helpful as it is in the adjustment process - could not be conveyed to everyone in those days. Nevertheless, the presentation attracted many compliments of true experts and calls from vinyl enthusiasts all over the world, who liked to buy this awesome piece of art and did not want to believe that the VPM-2010 was not yet completely finished. There were also reports about it in magazines as well as in many international audio related internet forums. As a result, co-operation offers of mainly US- and Chinese distributors flooded Horstmann's mailbox. In one of the resulting discussions, in which the sales company simply did not want to let loose and insisted on getting a price quote for the record player, even though Horstmann still did not consider it market ready yet, he finally called for the amount of 500,000 Euros, in the hope that this would temporarily restore peace. As utopian as this sum may sound in the first

From the two detailed pictures of the tone arm with its suspension and control unit, one quickly realizes how much effort is required to achieve the advantage of a true 'zero tracking angle' error even in case of tangential tone arms





moment, however, it is not on closer inspection: Until that time, the project had consumed raw materials summing up to 40,000 Euros, and by applying a reasonable hourly rate for Horstmann and his two highly qualified co-workers, the result is a total sum for which you can buy a nice house in many parts of Germany. To the surprise of the developer, said distributor instantly accepted the amount Horstmann had mentioned without any hesitation and subsequently marketed the player on the internet, leading to the situation that the VPM-2010 more or less officially received the label of the „most expensive record player in the world“.

Although the production of a small series of the drive could economically be worthwhile, so far this has not been pursued. Instead, a second drive was launched in 2012, this time a direct drive. Like the first one, it works with a magnetic platter bearing that is capable of turning the heavy, multi-layered platter into a perceived weightless rotation. With this principle, however, Horstmann inherited a problem which so far could not be satisfactorily resolved by any manufacturer and has therefore mostly been concealed by everyone: the demonstrable influence of the strong magnetic field onto the sensitive pickup system, leads in practice to a change in the bearing load of the cartridge during the playing process. Horstmann overcame this by incorporating several Mu-metal elements

into the platter, which is difficult due of the nature of this material. Because of this, Horstmann achieves an efficient shielding of the cartridge from the underlying magnetic field during the playback process. It is also unique that the lateral guidance of the platter disk bearing is taken over by two special developed ball bearings. The company FAG, which belongs to the Schaeffler Group, being one of the biggest supplier firms in the German automotive industry, has already expressed an interest in taking over this principle for their high precision laboratory measurement tables.

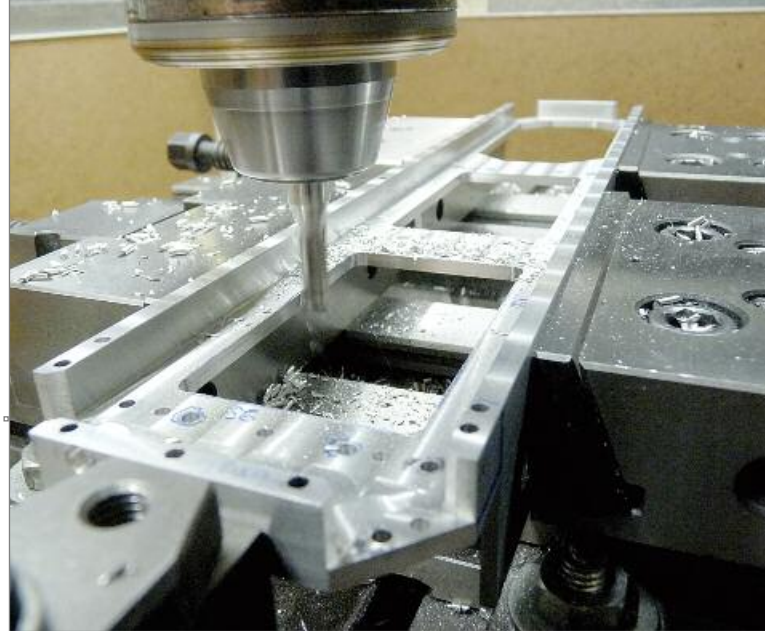
Up to now, however, the direct drive “Dere-neville DD-01” is still in prototype status because the priorities have consciously been changed in the meantime. Besides the development of a modular drive, a fundamental overhaul and further development of the tangential tone arm concept towards serial production readiness was at the forefront. The Horstmann tangential tone arm, which not only accidentally has much in common with a vinyl record cutting machine, is truly unique regarding its function principle and construction. Its core concept is a linear unit which guides the cardanic arm in the direction of the centre of the platter, following the progression of the record grooves. A laser system, which is also adjusted by two linear guides, continuously checks the 90-degree tangential angle of the arm to the groove, and passes the measured values to an electronic controller. The controller then regulates the movement of the linear unit in 256 micro-steps per single step, whereby the arm can perform 800 single steps during each full rotation of the platter. This means that the smallest possible single movement range is theoretically 0.000024 millimeters, leading to a completely smooth movement without any jolting. When asked why he is performing such a huge effort to create a flawless working tangential tone arm, while there are some classic radial tone arms around which do their job reasonably well, the designer replies that even the tiniest tracking angle error is clearly audible in the high-frequency range, for example via a stereo-channel offset or in the form of clearly perceptible distortions in “S-sounds”.

Above: The Horstmann tangential tone arm is mounted in a cardanic manner and, in principle, rotatable like a radial tone arm

Below: Like a gigantic bridge, the linear unit of the Dere-neville tangential tone arm, built of high precision parts, resides above the drive



Apart from larger parts, Rainer Horstmann's metal work is carried out in his in-house workshop, on a Deckel-FP2 tool milling machine....



... whose origin dates back to 1974. However, with some modern updates, it entirely fulfils its purpose. What would such a machine cost these days as a new purchase?

How spectacularly unspectacular, clean and stress-free analogue recordings can be without these unwanted artefacts, we experienced on Horstmann's own domestic HiFi system - a truly remarkable setup. Rainer uses an older Revox power amplifier pair, which he had personally technically overhauled and improved in close co-operation with a renowned "Revox-Guru". The amps are connected to a pair of the legendary Tannoy Canterbury 15-HE loudspeakers in a vertical bi-amping arrangement. Horstmann had bought the speakers from a second-hand dealership in Switzerland and dismantled them in order to bring chassis and housing separately over the Swiss-German customs border. The amplification of the signal generated by the Dynavector Te Kaitora Rua MC system installed in the tangential tone arm is taken over by a Monk audio phono stage instead of the Revox preamplifier. The third and most recent incarnation of the Dereneville record player, the "Modulaire" - still anything but slender, serves as the drive. Instead of the perceived rather technical looks of the "VPM 2010-1" - so the name of the current version of the first Dereneville player - the "Modulaire" has a cleaner and more structured appearance. The fact that the drive base consists of Corian, the platter

has a multi-layered structure and is suspended by means of a strong magnetic field summarizes the design principles of Horstmann's technical universe. In addition to the Dereneville tangential tone arm in its latest development stage, there is also a classic Dynavector DV-507 MKII radial tone arm mounted to the record player, which provides space for a total of four tone arms.

The wall of sound that now emerges from the Tannoys, with its clarity and self-evidentness, its ability to revealing the finest details, its dynamism against a pitch-black background, simply leaves me breathless for a moment. Once the first tunes start playing on this set-up, you forget everything you have just learned about the technology - no matter what kind of record is on the platter. In a nutshell, I've never listened to Kate Bush's "Hounds Of Love" (EMI, KAB1, UK, 1985) in such an emotionally involving manner - which was even more amazing for me, as I've always considered some songs on this album being in the category „requiring getting used to“.

Now, Horstmann is working on a „light version“ of the "Modulaire", which is expected to come to market as a pure naked drive with a almost five-digit price tag, i.e. in the same price range where the "not-yet-reference"



Complex parts such as this one, are produced on the tool milling machine in several working steps with an accuracy in the micro meter range ...mainly for the tangential tone arm



Bilder: Rainer Horstmann

Johannes Gremme and Dr. Hans-Bernhard Bröcker teach Rainer Horstmann's fine mechanics masterpieces to run: Both are responsible for the electronic regulation and control processes

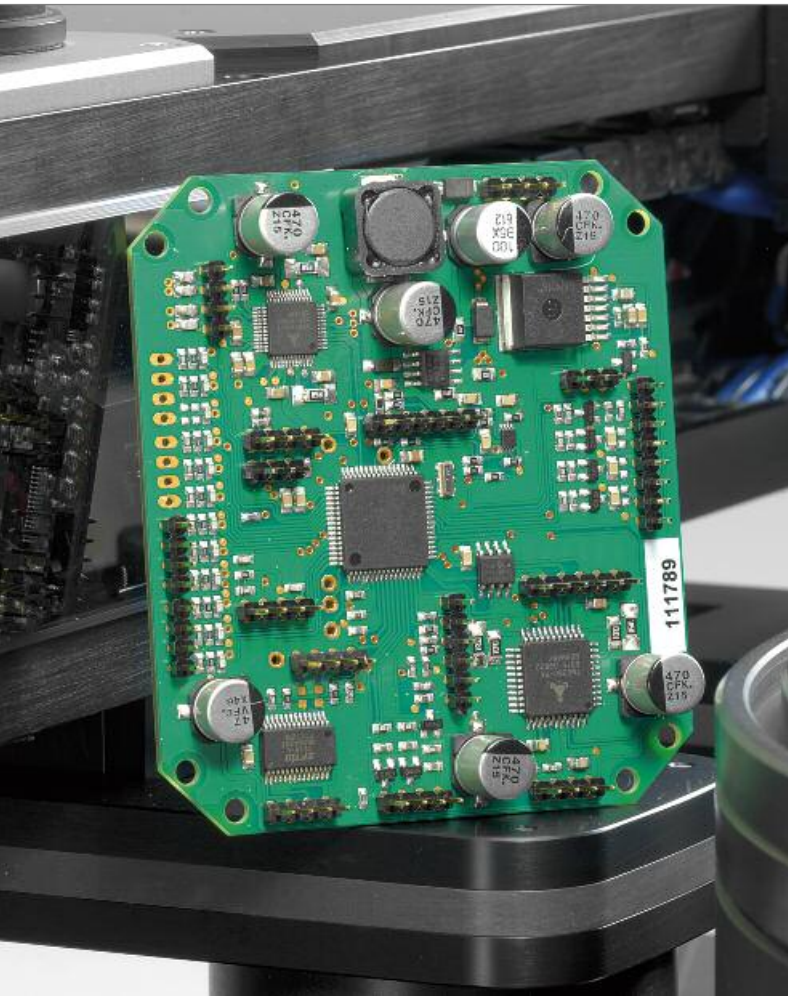
products of established competitors such as Clearaudio and Acoustic Signature go over the counter in quite considerable quantities all over the world. The design drawings already exist. On the other hand, the tangential tone arm, which could also be used on the „Modulaire Light“, will still be priced at around 30,000 € which however should not really surprise anyone in view of the construction effort.

In Horstmann's world, however, superlative mechanical engineering is not the only thing of interest. When he learned that I was just about to do a review of the Rega Planar 3 turntable for the renowned „Image Hifi“ magazine, he conjured up a mini-version of his silicone platter mat tailored for the small sub-platter of the 850 Euro player. „Try it.“ He had just ordered a Rega for a friend who wanted to get back into the analogue range, because at that price the Rega is nearly unrivalled. When looking at the resonance behaviour, it had not quite convinced him, that the glass platter was located on a plastic sub-platter. „Sometimes little things can easily have a big impact ...“ Right, Mr. Horstmann! This unimpressive piece of silicone really brings the Rega forward - thanks for that!

One project, which had floated around the head of Horstmann for quite some time, he

will however most probably no longer pursue: He wanted to build a record cutting machine on the technical basis of his tangential tone arm. The iconic company „Neumann“, whose cutting machine production was discontinued in 1982, had already confirmed to support the venture, since today they would have to start from scratch again for a self-development. Additionally, when it comes to the required engineering hours while considering the relatively small numbers of future machines sales, the corporate financial controllers would „go crazy“. For a long time, he had considered whether he should invest another three, four years of his life into the project. However, he decided to focus more on enjoying life and to see a bit of the world as part of his retirement: „So the cutting machine will have to do be done by somebody else ...“

It would -of course- be very welcome for lovers of the „black gold“, if a serious and creative developer like him would get involved in this topic. After all, today's stock of old-fashioned record-cutting machines is still kept alive somehow -much like the American classic cars from the 50's in Cuba- but even those will „bite the dust“ at some point in time. But even a Rainer Horstmann cannot do everything. Especially because his two



Even for the wonderfully “irrational” Dereneville masterpieces, solid rational production design principles are applied. This tailor made electronic board can either be used for the control of the Dereneville motor unit or the Dereneville tangential tone arm

“fellow musketeers” and he himself - retirement or not - are already more than fully occupied with their actual projects.

In contrast to a weirdo, who has put himself in the head to build the best, most expensive, biggest, heaviest - and what else superlatives there may be - record players of the world, as if it was for a silly record breaker TV show, Horstmann works with his heart and mind to push the boundaries of the reproduction of analogue records and to redefine the technically feasible. One can only wish that his products are soon sold to a degree that can at least be understood as a reward for the effort. Because our audiophile dreams only become alive due to people like Rainer Horstmann.

*Eric van Spelde*