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音響技術



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English Version



Ultimate Temptation of 0.008 degree

The golden Chopsticks Tonearm from Switzerland

Thales Simplicity

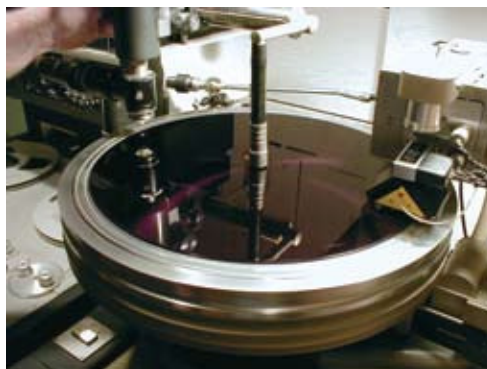
As an LP audiophile, you'd know for sure the most ideal LP playback is to simulate how a cutting tool proceeds on a record cutting lathe — the stylus is on the tangent point of the record groove, that is, the tonearm is always perpendicular to the groove. Theoretically, this is the ideal way to replay a record with zero tracking error and least distortion. And actually, beginning from the 50s, when long-play record has developed to its mature state, half a century has passed; tonearm designers and engineers are still aiming at this as their ultimate design goal.

Pivoted Arms Vs Linear - tracking Arms

Tonearms available in the market today fall into two categories: the PIVOTED and the LINEAR-TRACKING arms. Since a linear-tracking arm travels in a way very close to that of the cutting tool when making the metallic mould on the cutting lathe, there is no tracking error, no need for adjustment of any anti-skating force. Moreover, its arm is short, that means its effective vertical mass is much less. For these reasons, the linear-tracking should be an ideal arm design. But, on the other hand, since the arm is moving horizontally, its effective horizontal mass is unavoidably

much higher. What is more, how to manage the inertia of the wires inside the tonearm, how to ensure the smoothness of the horizontal movement without any friction, are main design problems. This makes the design of a linear-tracking arm much more complicated than a pivoted arm, the cost is higher, and the correct assembly and adjustment are relatively more difficult.

The pivoted arms are much simpler in construction, and are available in many different designs and brand names; price ranges are much wider, assembly and adjustments are also easier; and they are more popular among audiophiles. Many experienced audiophiles can



△ LP cutting lathes

master the tips of a well-designed tonearm, and are able to create a high standard record replay. However, since the tonearm is built on a pivot, the arm travels in an arc across the record. Physically, there are only 2 null points (when the arm is tangent to the grooves), no matter how precise the design is, or how accurate the assembly and adjustment are. Other than the 2 null points, there is always more or less tracking error that leads to distortion; the closer to the centre of the record, the more serious the problem is. An error of less than 2 degrees is considered to be acceptable. Even if the arm length is increased, the error is lowered but still exists. That is why we LP addicts have a common wish long laid in our hearts — when shall we have a tonearm that possesses the merits of both a pivoted and a linear-tracking arm?

A Significant Breakthrough

In the 2008 Munich Hi Fi Show, I saw a young man concentrating in the adjustment of a strange-looking tonearm. It looked like a common pivoted arm but the arm pipe was only 6" long. On the foremost part of the arm was not the cartridge, but a circular bearing which was joined to another 11" arm built with a headshell, the end of

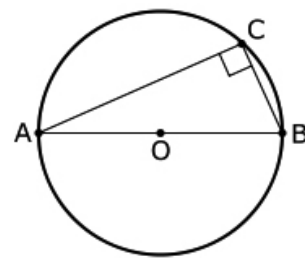


△ Thales Original Tonearm

which has a cardan bearing fixed to the base of the whole arm set. I had never seen such a tonearm construction, and it looked awkward! But when the young man had finished the adjustment and put the cartridge to the record, I couldn't believe my eyes! The tracking angle of the stylus was continuously changing, and it kept the most ideal tangent to the record groove! Wow! That was not a minor discovery! No wonder the sound was so clear and transparent, without any distortion!

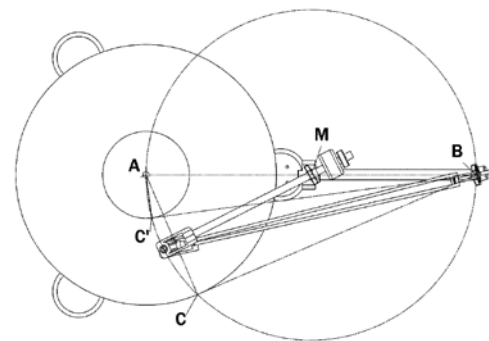
This young man was no other but Micha Huber, designer of the Thales tonearm. Only 28, Micha was a mechanical engineer and

a professional musician. Having worked in the design department of a Swiss watch company for 5 years, Micha developed his own company, Hi Fiction AG, and Thales Tonearm was his first product. The reason why he named it Thales was because the design philosophy adhered to the Thales' Theorem: "If AB is the diameter of a circle, and C is any point on the circumference, angle ACB is always a right angle."



△ Thales' theorem

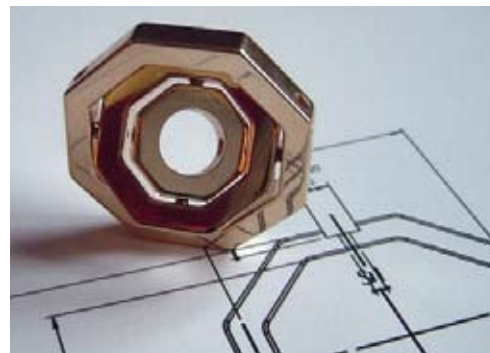
On the diagram shown, the length of BC is so designed that its length is always changing to ensure C is always on the circumference of the circle with M as centre and AB as the diameter. Then, by Thales' Theorem, angle ABC is always a right angle. What a clever design! Of course, Micha has this design patented.



△ working concept of Thales tonearm

The Art of Watch-making

Micha said the Thales tonearm combines the advantages of the pivoted and linear-tracking arm. It looks simple (already very complicated to me!), but is extremely difficult to manufacture. The arm is composed of more than 100 small parts. For example, the gold-plated cardan bearing consists of 12 sapphires, and is assembled by Swiss Watchmakers; the head bearing (situated above the headshell) which couples the 2 arm tubes has 25 separate parts, but weighing only 1.62g. The arm and the headshell are made of magnesium; all edges are hand polished by watchmakers. The effective mass of the arm is 12g.



△ Cardan bearing of Thales tonearm

Properties of the Thales arms include no tracking error and its resultant distortion, short arm length and negligible resonance. Because of the pivot bearings, it has very small friction; naturally, there is no vertical tracking bearing; the inertia of vertical and horizontal trackings are symmetrical.

I believe, no matter from which point of views: design philosophy, finished product, or actual auditioning, the Thales tonearm is a real breakthrough in record replay.



△ Burne-Jones Super 90MKII tonearm



△ Garrard Zero 100 tonearm

Micha admitted that other designers have also worked on tangential tracking arms; examples are Burne-Jones's double-tube tonearm in 1953; and in 1970, the veteran British Record Player manufacturer Garrard made a double-tube tonearm, Garrard Zero 100, and successfully decreased the tracking error down to 0.43 degree. Unfortunately, the accuracy of the product was not high enough, and the record replay was unstable. As a result, it was not generally accepted in the market.

Because of the outstanding performance of the Thales tonearm, Micha received many orders. In the following year in CES, Micha launched the Thales AV(Aluminium Version). In the new version, the cardan bearing was chrome-plated, the arm tube and the headshell were made of aluminium alloy and bronze anodized, and the effective arm mass was raised to 16g.

The original arm was renamed as the Thales Original.



△ Thales AV tonearm

A Joyful Discovery

Apart from the high price(HK\$150,000!), the design and performance of the Thales had won my heart, but the extension part of the arm took a lot of space, which was not practical for my new turntable, SME 30/12, I could only admire.

Last year(2010) in the Munich Show, I met Micha Huber again. He was showing a new tonearm, the size and look of which were similar to a traditional pivoted arm, but with two arm-tubes, which looked like a pair of chopsticks. When I looked carefully into it, I found it worked like the Thales Original — when the cartridge was moving towards the inner grooves, the tracking angle was slowly changing, always keeping the tangential 90 degrees.



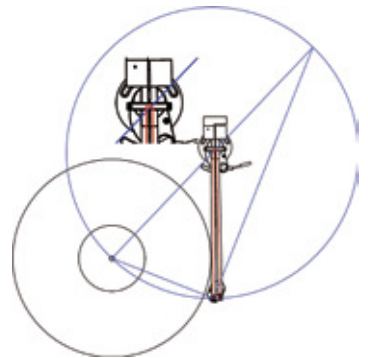
Comparing to the Thales Original, the construction of this new tonearm was so simple, it almost moved me to tears!

It's such a happy discovery, I immediately asked Micha what this was all about. He told me this was his newly developed tonearm, the Thales Simplicity. Although it still adhered to the Thales Theorem, the Simplicity was quite different in design. Instead of 3 pivots in the Thales Original, the Simplicity had 4. That was, the geometric construction was changed from a triangle to a quadrilateral. For a triangular construction, one of the arm tubes had to change its length all the time in order to keep the tangential tracking, and that was the reason why the Original had such complicated 3D construction. A quadrilateral design, on the other hand, made use of 2 tubes of fixed length. That made the design much simpler and substantially lowered the manufacturing cost.

The Simplicity has no specific guiding or aligning arm tube, but the two tubes are set slightly off centre, forming a narrow inverted 'V'.

The 6-sapphire, chrome-plated

cardan bearing and the double ball bearing on the front part of the arm tubes are assembled by Swiss watchmakers. The 4 pivot positions are precisely calculated based on the Thales' Theorem and are fixed in positions such that the tracking angle changes in accordance with movement of the arm. Micha claims that Simplicity has as much as 4 null points, while a traditional arm has only 2. The maximum tracking error is only 0.008 degree. (For a traditional pivoted arm, you need to have an arm length of 1500 inches to achieve such low error!) Anti-skating is self adjusted by 2 tiny magnets integrated in the counterweight.



△ Working concept of Simplicity tonearm

Audiophiles will be excited to see Micha used 4 super thin (0.07 mm) enameled 6N copper wires for the tonearm conductors. There are no connecting points all the

way from cartridge to the phono stage, but there is a small aluminium box and nylon sleeves for the rear section for mechanical strength. The wires are twisted together to minimize humming. Customers can choose RCA or XLR connectors. Such Signal Express passage is for sure the most desirable arrangement for tonearm wires.

As a result of such shocking experience, after returning to Hong Kong, I immediately ordered a gold-plated Simplicity through Thales' HK agent, Audio Exotics. My SME is also gold-plated, that makes a perfect match.

Real Simplicity

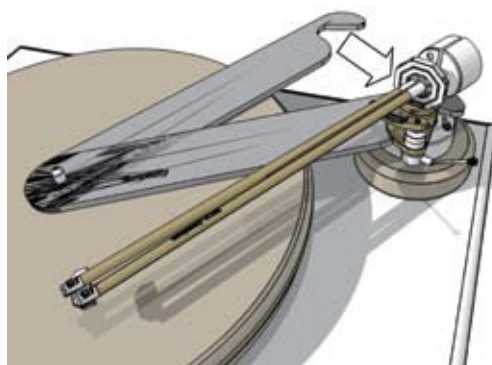
I ordered my Simplicity in mid May last year, and received one numbered 007 until the end of October (The delay was due to the prosperous watch industry in Switzerland). My SME 30/12 has a flexible design: you can change the length of the arm from 12" to 9" simply by turning the arm board 180 degrees; and Thales can make an arm board at a reasonable charge for any arms including SME, naturally. When I read the manual, I find the installation of Simplicity is a Real Simplicity, because the whole process from installation to adjustment is truly very simple! There are only 8 pages in the manual and that includes the

whole process. Just follow the steps and illustrations, you won't get it wrong, 100% user-friendly.

How simple it is to install the Simplicity? Here I would like to illustrate some of the steps.

For a traditional pivoted tonearm, you have to measure very carefully the distance between the turntable centre and the bearing, then the overhang of the stylus. And that's quite a complicated process, and you must be extremely careful not to cause any damage to the stylus.

With Simplicity, a special measuring protractor is provided. You simply insert the hole in one end of the protractor to the turntable spindle, the other end to the arm base. The shape of the protractor fits the arm base perfectly, so there is no worry of inaccuracy. The only thing you should take care is not to let the protractor press on the 4 little thin wires projecting out from the arm.



Installing the cartridge is even easier. There is another calibrating tool provided for this purpose. First, you fix the cartridge to the headshell, then insert the combination to the groove in the tool, align the stylus tip with the cross sign on the tool, tighten the screws, and that's it!



Now you can put the cartridge with its headshell and fit it to the stainless steel strips at the front of the arm tube, tighten the screws, and the whole process of cartridge installation is finished. Simple as that!

There is not any tolerance between the arm tube and the headshell, which shows the super Swiss craftsmanship. You can even order a few more headshells, then changing to another cartridge is a matter of minutes.

Other processes such as VTA, Azimuth adjustments are also very simple. Simplicity is a real simplicity!

A Visiting Trap

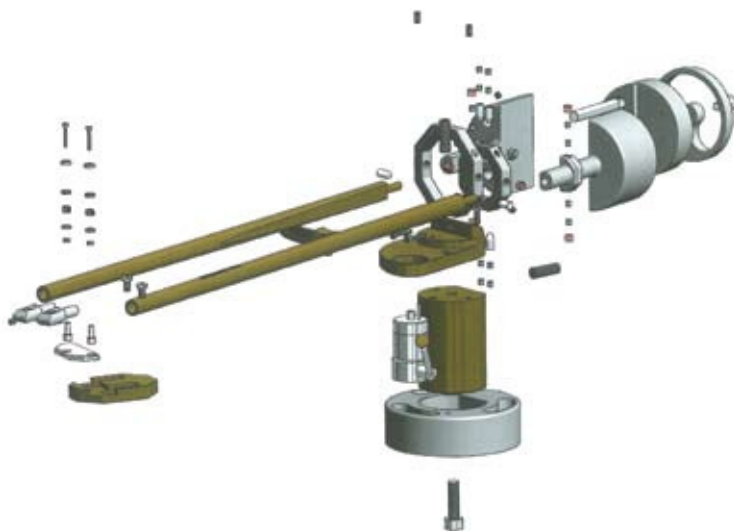
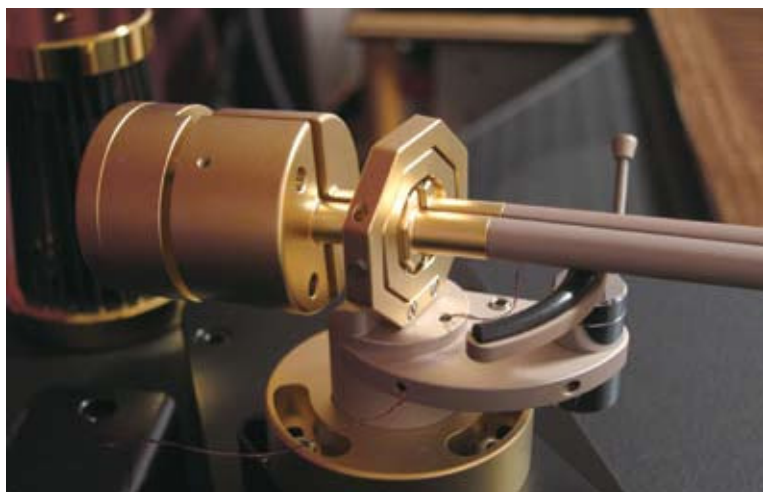
After I have installed the Simplicity to my Air Tight PC-1 Supreme cartridge, I found I spent more time on LPs. That's because the performance of my LP system has significantly surpassed that of my 5-piece Esoteric digital source.

The news spread. My fellow reviewers Vitus and Lee 388 couldn't wait to come to my place to have a listen. The visit turned out to be a trap; both fell into it and ordered one some time later. Since they also have something to say about Simplicity, I'll make my comment short.

TRACKING: With my Air Tangent 10B air flow linear tracking arm, the positions of singers and instruments were very accurate; but with Simplicity, the stability of the positions is even better. Be it a singer, an instrument, ensemble or solo, the positions are as stable as a mountain, without any drifting.

LIVELINESS: Simplicity is composed of 2 aluminium alloy arm tubes, each 9 inches long, with an effective mass of 19g. The resonances of the two tubes are deliberately fixed at an incompatible ratio; the cardan bearing and the double-ball bearing are so precisely made, the tracking is super smooth. The sound is light and lively, without any trace of dullness. It is open as a sunny day, and exciting as thunders. Listening to it is always a pleasure.

PERFORMANCE ON WHOLE SPECTRUM: On the high end, it is clear and transparent, with no edginess. The mids are full of body and texture, and the basses are deep and bouncy, significantly better than many linear-tracking counterparts. I am 100% satisfied with it. 🎧



Conclusion The more I listen to the Simplicity, the more I admire the young Micha on his enthusiasm and understanding on the replay art of the old LP, and his creation of the two Thales tonearms. I am not surprised that Vitus and Lee 388 fell for the temptation of the 0.008 degree. I did that more than half a year ago!

Witness to the power of 0.008 degree

Thales Simplicity Tonearm

Among my audiophile friends, some of them like LPs a lot; but they don't have any LP system at home. They say it is very difficult to handle. What they fear is the complicated way to set-up a decent system, so they rather give up. With the coming back of LPs in recent years, more and more tools are available to make setting up a record system a lot easier than in the old days. When the Swiss-made Thales tonearm emerged in 2008, the difficulty in LP set-up has been completely cleared up. It has rewritten the history of LP system installation.

The Simplicity tonearm comes with a protractor for measuring, and a special tool for installing the cartridge. With these tools, installing is as easy as can be; you can completely forget about 'overhang'. VTA and balance are also simple jobs with Simplicity. You can download from the internet the manual and see for yourself how convenient it is. Besides simple set-up, what arouses my interest greatest is the tracking error of Simplicity is less than 0.008 degree, that's a figure traditional arms can never achieve.

This tonearm, Thales Simplicity, comes from Switzerland. It has a double arm tube design so that when the cartridge moves to different positions on the record, it will adjust its tracking angle automatically, keeping it to a maximum error of 0.008 degree. To achieve such high accuracy and smoothness, it needs very precisely-made bearings. And these bearings are made by Swiss watchmakers. Of course, the construction of this tonearm is very complicated and it contains many small parts.

0.008 degree is only a figure; the actual performance has to be judged by listening. When I knew Lincoln has installed a Simplicity tonearm on his turntable, I couldn't wait to take a chance to listen. When I actually saw this tonearm, I was impressed by its delicate craftsmanship and its perfect finish. Undoubtedly this is a Swiss-made masterpiece.

When I moved the arm gently, I felt it had very high flexibility. Although it had two arm tubes, its mass was quite small. This ensured the sound

would not be dull. When the cartridge fell on the record, I heard a very steady sound stage. When playing Beethoven's Violin Concerto, all the instruments were distributed on every corner of the stage, layer by layer, from left to right, as lively as could be. The violin was so real as if David Oistrakh was standing right there. The position of the violin remained on the same position from the outermost groove to the innermost. This proves the tracking error was unnoticeable.


When playing LPs with traditional pivoted tonearms, we all experienced that the sound has an unstable property, especially towards the inner grooves of the record, no matter how accurately you had made the adjustments. But this was not the case with Simplicity. We tried a record by the Chinese female singer, Tsai Chin. There was not a trace of instability, again, from the outermost groove to the innermost.

Listening to 'Hotel California' from the Eagles, the high speed of the plugging and strumming of the guitars were full of life. And this must be due to the lightness of the arm. Many details emerged which I have never noticed before. It was like listening to a new recording.

Then, I asked Lincoln to play Dire Straits 'Private Investigations'. Like 'Hotel California', I noticed many small details, like never before. The bass was also excellent, made one's pulses beat with the rhythm.

Finally, if the obstruction for you to join the 'LP gang' is because of complicated installation problems, Simplicity has helped you remove this obstacle. What is more, it brings an incredible 0.008 degree tracking error. This is a most worth having tonearm in recent years and many years to come. 🎧





Give me a view in
a New Light

Thales Simplicity Tonearm

In mid February, Lincoln told me his new speakers and tonearm have been well run-in, and were ready to show their real power. I put down my work and went to his apartment with another reviewer, Lee 388, that very day. The first thing that caught my sight was a pair of Ktema speakers. I knew Lincoln has changed to Ktema, but the last time I saw it, it was in Satin Sycamore finish, now he has changed to high gloss piano black, quite a different style. I have also experienced the excellence of these speakers playing both CDs and LPs.

As usual, Lincoln let us listen to some CDs. After listening to the first CD track, I found that the Ktemas have blended with Lincoln's listening room perfectly. Since the last visit to Lincoln, that's a few months back, I have also upgraded my CD players and speakers. I found my system had come closer to Lincoln's. Closer, but still far, far apart!

After CDs, there came the main course: it was a new tonearm installed on his SME 30/12 turntable, the Thales Simplicity. This numbered 007 tonearm looked like a pair of golden chopsticks, made with exquisite workmanship, with unique bearings and balance weight. The tonearm wires leads from the cartridge to the phono stage, 100% handcrafted in Switzerland. The packing was first-class, yet the installation was very simple. Just use the protractor provided, the arm could be set-up accurately without any problem.

Simplicity is a pivoted arm, but without its shortcoming of tracking error, because it can automatically adjust its tracking angle, keeping the error at any position within an error of 0.008 degree. It has the merits of both the pivoted and linear-tracking arm.

Lincoln fitted on the Simplicity an Airtight cartridge, which was also gold-plated. When David Oistrakh's Beethoven Violin Concerto was played, a violin appeared in front of us, we could "see" how he

pressed the strings, we heard details of each string, we saw the orchestra spread out behind the violinist. I have never experienced such clearness, vividness and so many details. This replay was a surprisingly big step forward compared to the previous tonearm. The position of the violin remained rock-steady from the beginning to the end, and that was most impressive. Such result was certainly due to the improvement of tracking.

Listening to Eagles, "Hotel California", I enjoyed the power of Simplicity's dynamic range. The bouncing of the guitar was like an electric shock, the vicious drumming made me breathless. In Dire Straits "Private Investigations", the bass penetrated through the floor, the 3D images were never so true. Harry Belafonte's "Matilda" revealed the comprehensiveness of the Simplicity. Before leaving Lincoln's place I was figuring whether it was time to upgrade my tonearm.

One month later, I happened to meet Simplicity again in another audiophile's home. This time, I have the rare chance of listening to the extremely costly out-of-print original LP, Joan Baez's "Diamonds and Rust in the Bullring". The mids and highs floated over a solid bass foundation, the voice showed no splitting even at the inner grooves of the record. At that moment, all I wanted to know was how long would it take to deliver a Simplicity if I put an order. On the other hand, SME had just launched 20/3A, an upgrade version of my 20/2A, some specifications of which were raised to that of 20/12. All these tempted me to rethink my upgrading plan. Finally, I made up my mind to go straight to SME 20/12, plus Simplicity and an Ultra Eminent cartridge. Now I am looking forward to listening to more LPs with my new system.

LP system is not dead, it is still making progresses in the 21st century, and Thales is a major breakthrough. I would recommend it to all LP addicts without reservation. 🎧