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Acoustic Signature

《Invictus jr.》Bell-drive Turntable and 《TA-9000》Pivot Tonearm

Rock-stable, yet Light and Easy

By Lee388

The biggest problem faced by Hong Kong audio enthusiasts is space. Even in so called luxury apartments, spaces for Hi Fi equipment are limited. Many serious enthusiasts would put 'size' as one of the conditions to consider when they are buying an audio equipment. But generally, the more high-end an equipment is, the bigger its size. So, when some audiophiles are looking for real high-end gears, big sizes are the biggest obstruction.

Now the bell-driven turntable 'Invictus jr.' by Acoustic Signature has a good solution. The aim of this new turntable is to build one similar to the flagship 'Invictus' as far as sound character is concerned, yet with a much smaller footprint. Acoustic Signature describes 'Invictus jr.' as the son of 'Invictus', their relationship is self-evident.

Design with sophisticated software

'Invictus jr.' is a reduced version of 'Invictus', its volume, shape and mass are all different, the overall resonance also changes. In addition, the sonic performance must be close to the flagship 'Invictus', so it is not just a reduction in size, but a big project involving new designs and calculations. Fortunately, the new technology and software in the development of 'Invictus' can also be applied on 'Invictus jr.'. For instance, the Finite Element Software is used in the analysis of construction. It can define complicated geometrical shapes. When inputting different load conditions and other relevant data, the software will calculate the variations in construction vibrations. Then a program is designed to solve the vibrations problem.

Another applied technology is the Constrained Layer Damping, CLD. A sandwich aluminium and brass platter is designed and made through this technology, and vibrations are diminished by the damping materials in these layers. 'Invictus jr.' is equipped with magnetic floating feet, together with 54 proprietary Silencers on the platter, they can absorb all the smallest vibrations.

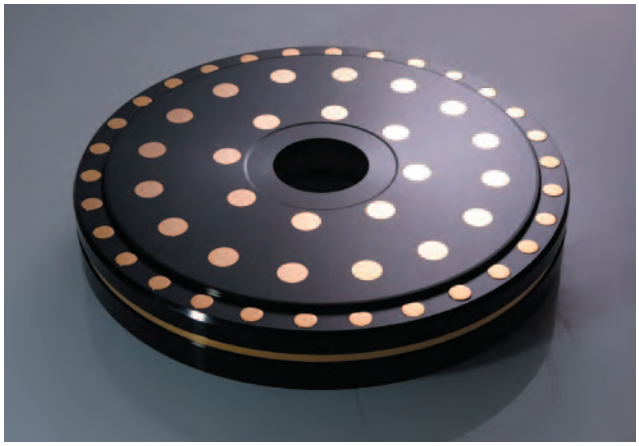
Specifications:

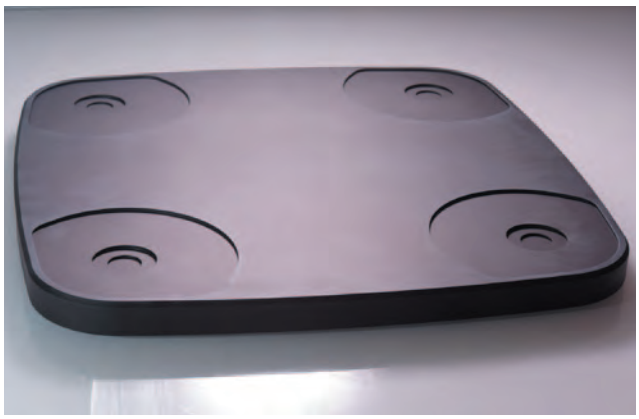
Invictus jr. Turntable:

■ Fixed plinth Belt-drive turntable ■ 4 motors ■ 33-1/3, 45rpm switchable ■ Size:Turntable: 526 mm x 526 mm x 262 mm（W x D x H）/ Power Supply: 240 mm x 207 mm x 93 mm（W x D x H） ■ Weight:Turntable:90 kg / Power Supply: 4kg ■ Price: € 69,500 (Silver/ Black) / € 74,300 (24k gold)

TA-09000 Tonearm:

■ Pivot Tonearm ■ Effective Length: 12 in. ■ Price: € 19,749(Gold plated)



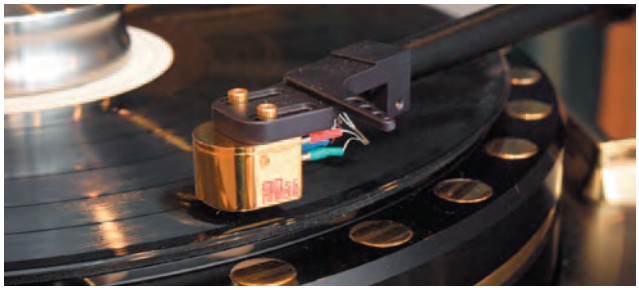


The result is a more quiet and darker background. The silencers are solid copper bars evenly inserted on the platter. This is a unique method to absorb the platter resonance as well as vibrations from outside. The more silencers used, the better the result. 'Invictus jr.' has the same number of silencers as the flagship 'Invictus'.

'Invictus jr.' is of the fixed plinth design. In addition to the methods mentioned above to deal with resonance, the weight of the turntable is also an important factor for eliminating outside vibrations. The 'Invictus jr.' is comprised of three main parts, the 19kg platter, the 14kg plinth and the 57kg of the main chassis, which add up to 90kg. Together with its rigid construction, the turntable is as stable as a piece of rock. It comes with a separate power supply, connected to the turntable through 2 red and blue LAN cables. The speed can be fine tuned at the back of the power supply. There is also a DSP circuit to synchronize the 4 motors. When the platter is lifted up, 4 motors can be seen situated evenly around the bearings, and the force exerted on the bearing is uniform, which also reduces vibrations. 'Invictus jr.' , like 'Invictus', uses Tidorfolon as the bearing material which is self-lubricated, end-users need not add any lubrication.

'TA-9000' , the tonearm with Astronautical bearings

I first saw 'Invictus jr.' in Munich Audio Show 2018. It



was in grey and black. The one in our audition room was a beautiful, glittering 24K gold special edition. Other colours could be pre-ordered, with additional charge, of course. Although 'Invictus jr.' is obviously smaller than 'Invictus', it still can install as many as 4 tonearms. Our 'Invictus jr.' was equipped with Acoustic Signature's top of the line, 12-inch TA-9000 tonearm. The astronautical horizontal and vertical bearings of TA-9000 came from the American specialist Timken. They were very precise and accurate. When I moved the tonearm lightly, I found its action very smooth, light as feather. The arm tube is machined from a single piece of aluminium, with pure silver cables. An installation gauge came with the tonearm. I used it to install the IKEDA SoundLabs 9Gss MC cartridge and found it very easy and accurate. When playing "Chai Qin Old Songs", there was no cracking sound throughout the whole record.

The stand-by power switch and the speed change button were on the front plate of the turntable. Pushing them for a few seconds could activate the functions. The main power switch was on the front plate of the separated power supply. After some installing and testing, I found the start/stop action was quite fast. When I switched to 45 rpm, it was very quiet, not any noise, even when I put my ears close to the turntable.

The Audition Combination

The gears we used for the audition included Kondo SFz step-up transformer and GE-1 phono stage. Preamplifiers were YS Sound YSS-782JP and Dan D'Agostino Momentum, Audia Flight Stumento no.8 mono block power amplifiers. Speakers were Dynaudio Evidence Platinum, with Nordost Odin2 cables. We used the IKEDA Sound Labs KAI MC cartridge first, and then changed to the flagship 9Gss of the same brand.

The Invictus jr. gave me a heavily-armoured impression, which made me think that the sound would also be heavy, i.e., steady but lack liveliness. After listening for some time, yes! The sound was stable and big. When playing big orchestras, the sound stages and images were very steady even when the volume was raised to a very high level. But to my surprise, its violin was very lively, the bow bouncing and plucking of strings were nice and clear, reaction was very fast, not a single trace of delay. When listening to vocal accompanied by double bass, the singer was floating in between the two speakers, no ambiguous or over-sized image, even when there was strong bass energy immersing the whole turntable. That was a good proof for Invictus Jr. and TA-9000, both had very high resistance against environmental vibrations.

I also found that this turntable and tonearm combination had no strong characters of their own. The differences in sound when switching from cartridges KAI to 9Gss were clearly reflected. The improvement in sound quality, density, the ability to reveal the smallest details and the size of the sound field, etc. were clearly revealed. These also proved both Invictus jr. and TA-9000 had no strong characters of their own.

Light, fast and natural

"Vengerov & Virtuosi" by Maxim Vengerov, one of my favorite violinist, was not a recent recording, but was first released in LP format by DMM technology in Germany. It was a very good LP with very little surface noise. I could hear many small details on the violin, the 'resin scent' was prominent. Could that be due to the effect of the Silencers?

I especially liked "Scherzo Fantastique"on Side D, a demanding brisk piece of music. It gave an opportunity for Maxim Vengerov to show off his amazing skill. The countless number of notes in a very short period of time was not only challenging to the performer, but also to the response of the equipment. For a turntable as heavy as Invictus jr., At first I worried if it could response fast enough, after listening to"Scherzo Fantastique", my worries were gone. The violin was light and nimble, and the piano was steady and open. Very touching!

In her first personal record "Kiss Me", the Korean Jazz singer Moon sang many classic Jazz songs. Following the success in CD, then came the LP. I chose this LP because I had talk to her in person and I had listened to her in live performance. I'd like to know if Invictus jr. and TA-9000 could remind me of Moon's real voice. The accompaniment through this combination was never exaggerating. I didn't feel too obvious extension at both ends, yet the sound was clear and transparent. Moon's voice was mature, very soothing. The all metal turntable did not give anything that sounded stiff.

Explosive power came from high rigidity

After listening to 2 LPs originated from digital recordings, the combination of Invictus jr. and TA-9000 gave very natural sound, non-digital, very analogue. I turned to "The Singles" by Carpenters, which contained all Carpenters evergreens. I wanted to know if the combination was too analytical and lacking that 'old' feeling. However, playing with this combination was better than what I expected. Yes, it was very analytical, I could hear details I never noticed before. At the same time, the sound was never stressed; you could hear Karen's beautiful soft and delicate voice which easily carried me away from the audition to the music itself.

Finally, I played the "Carmen Suite" directed by Ansermet. Although Invictus jr. was a reduced version of Invictus, it was very heavy by itself and it could deal with big orchestra sound without any difficulty. The effect of playing this LP was very satisfying, the sound field was steady and magnificent, the colourful orchestral sound was as lively as you were there. When the volume was turned up high, Invictus jr. was still rock stable, no confusion in orchestral parts, keeping its liveliness.

Conclusion

Throughout the audition, the impression that Invictus jr. gave me was STEADY. The speed was stable, the sound was calm. The sound was not only stable, but also natural and flexible, and that was most unexpected. TA-9000 also did its job very efficiently. It faithfully delivered the minute signals picked up by the cartridge to the system. Finally, as I mentioned in the beginning, space is a big problem for many audiophiles. Invictus jr. is an answer to these people with a relatively smaller size, yet yielding Hi-End sound. In addition, 4 tonearms can be installed at the same time. Even the most demanding audiophiles will be satisfied.

Solid as a Mountain, Nimble as a Rabbit

Acoustic Signature

Super Turntable Invictus jr.

By Lincoln

When I saw the Acoustic Signature new flagship turntable, the Invictus for the first time in Munich Audio Show 2015, I was deeply impressed by its heavy structure, ingenious design and fine craftsmanship. One the other hand, its € 120,000 price and 147kg weight (323g with heavy feet) frightened me off. In this year's (2018) Munich Audio Show, AS exhibited another turntable which looked similar to Invictus, but the size was reduced to 1/3 to ½, the weight was only 94kg, and the price dropped to € 69,500. AS described the two turntables as 'Father and Son', and the Son had inherited all the best design from the Father. The platter with 54 silencers was the same, only the plinth and the base were reduced to a smaller size. So, even Invictus jr. came only second in the AS turntable series, it had few opponents in the Hi-End turntable market.

As the cover feature of this issue, our Invictus jr. was the glittering 24k gold version, the price was € 4,800 higher than normal silver or black versions. To me, gold went perfectly with black, and the heavy, armored-car-like turntable looked gorgeous, just the gold surface was not easy to keep shiny all the time. With top of the line tonearm TA-9000 also from AS and the new flagship MC cartridge from Ikeda, Invictus jr. brought me extraordinary vinyl enjoyment.

I played Rob Wasserman's "Duets", a very high standard re-mastered LP by Analogue Productions. People familiar with this recording should know, this LP had a super good sound, given that the system including turntable, tonearm and phono stage were of high standards and properly set up. On the other hand, if there was any slight deficiency in any part of the link, the bass would be easily out of control, either too thin or too much, the vocals would be split or hoarse, there won't be any trace of an audiophile LP. I played one of the most difficult tracks, "Angel Eyes", Rob's double bass was just right, the low end was deep and powerful, the plucking, bowing and rich resonance of the body were faithfully reproduced by Invictus Jr. The Jazz diva Cheryl Bentyne's singing was of an even higher level! Her voice was beautiful and bright. When she was singing soft like a whisper, all words were clear and melodic. In the climax, Cheryl sang without reservation, her breath seemed endless, her volume was big, but all details were there. She kept her superb musicality, while her sound image was still as steady as ever, the dynamics with great contrast were perfectly reproduced.

When playing a pipa solo by Wong Ching from Hugo's "White Snow in Early Spring", the high technique of the soloist, the big dynamics, powerful energy and the high speed fingering were perfectly captured by Invictus jr. The music flew smoothly, every note was clearly and beautifully played, like pearls dropping on a jade plate. The arrangement with strings and percussions accompaniment made this ancient pipa piece shine and was very enjoyable. The sound effect was very attractive, bringing out the best of the vinyl records.

△ This 16,000 sq. ft. factory has an office, a production department and an audition room. It is big scale among other producers.

Conversation with the President of Acoustic Signature

By Martin

Audio Industry has a long history. Among various kinds of products, the vinyl record players have been with us for at least 70 years. I can imagine there is still room for improvement for such old machines. Are they not just plinth, platter and bearings? Have all applicable materials and technology been found and used in these few decades? The bottle neck has been reached and there should not be more room for progress! Yet, that is not true. The fact is, with the aid of computer instead of just machines and experienced craftsmen, they are still making progress. The German Acoustic Signature makes good use of the computer in manufacturing many of their tonearms and turntables.

In the past, I only saw these turntables in Hi Fi Shows, but never experienced their performances until earlier this month when I finally had the chance to audition the Invictus Jr. Second to the flagship Invictus, this 94kg turntable was the heaviest ever tested in our audition room. This was crazy! Frankly, I and my colleagues were a bit worried when putting it on our THIXAR SMD Ambitious MK II Rack. When we heard some cracking sound from the rack, we quickly moved the turntable back to the floor, fearing it would damage the rack. I couldn't help thinking if it was really necessary to make it so heavy? But anyway, we had to find a solution. First, I consulted the THIXAR boss, Dirk Rüdell. Dirk confirmed that each layer of the rack could hold 50kg and 200kg for the whole rack. Invictus Jr. was under 100kg and there was nothing to worry about. He even boasted that he could replace a new one if there was any damage. Alright, we could only listen to him. And until I was writing this article, so far so good!

Although Invictus Jr. was unreasonably heavy, I couldn't but admire its perfect craftsmanship. Everything, including every screw and joint, was perfect. When installing the arm board, the screws were in line with the screw holes perfectly, the groove on the board was very smooth and I could install it with the least of efforts. It was common that there were always some little troubles here and there when installing different equipment, Invictus Jr. was a rare exception. It not only made every accessory to perfection, the platter and bearings were also super accurate. When they were coupled together, it looked as if it were one piece, not even the joint could be spotted. I learnt that the platter and bearing of each turntable was of one set and couldn't be interchanged with another turntable. If there was a problem with the bearing, it must be changed together with the platter.

The platter was of three layers, a brass layer with 54 brass cylinders in between aluminium top and bottom. The aim was to produce a wide range of resonant frequency by different metals. The middle brass cylinders were used to absorb vibrations. Because of the accuracy between the platter and bearing, it was extremely tight when putting the platter in. And since there was only a recess in the plinth for putting in the platter, it would easily clip and hurt one's fingers. So, special attention should be paid. Taking out the platter was equally difficult. But on the other hand, if there was too big a tolerance, it would definitely affect the stability and cause resonance. Only extreme accuracy could have the lowest distortion. And that was hidden Hi End.

Invictus Jr. includes an aluminium base, a sandwiched plinth, bearing and the platter. Its power supply and speed control are separated from the turntable, the 4 motors are hidden in the base. For installation, first step is to set the horizon level of the base, and then put on the plinth, the bearing and 4 rubber rings, and finally the platter. At first, I thought it to be time-consuming in setting the base, but in fact, it was even easier than setting an entry level turntable. That shows Gunther Frohnhöfer has thought of every detail in his design and he knows how far they can go. Half of Acoustic Signature's business is OEM for other manufacturers. Orders not only come from the audio industry, but also from other companies for all sorts of aluminium products, while turntables account for only a small part of the company productions. We can see Acoustic Signature is well recognized in the industry. Being established for over 20 years, from a small company with less than 10 employees, it has developed into a factory of 16,000 sq. ft. with 22 employees, 5 CNC machines, including a 5-axis one, several 3D printers and computer analysers. Basically, besides raw materials, all parts of a turntable are self-supplied, which is a remarkable achievement.

Gunther Frohnhöfer is typically a hard-working boss. He is traditional, but never resists new technology. We met several times before but never had the time for a detailed talk. The chance came when he was in Hong Kong for the August Hi End Show. I took the time to make a short interview, mainly talked about the productions.

M : I saw different turntable models in the Acoustic Signature booth. Obviously, Invictus Jr. is second to the flagship model. Could you briefly say something about it?

G : Invictus is the flagship, and a very successful model. After its launching, we received feedback from our customers, they loved Invictus, only that it was too big, they found it hard to have the space to keep it. The only solution to this is to make a relatively smaller

turntable, and at the same time, keeping most of the technology from Invictus. With such concept, we started the Invictus Jr. project from 2016. Now what you see in Invictus Jr. is very similar to the flagship, with the same platter, can accommodate up to 4 tonearms, 2 for 9" and 2 for 12". The special feature about Invictus Jr. is that it has magnets inside the 4 feet. These magnets are very strong and they are separated from each other by 0.5-1mm. In other words, the turntable is floating on magnets, so that the turntable is isolated from the hi fi rack or other surfaces. That helps a lot to the sound.

G : One more important thing: we have designed an all-digital speed control which also acts as the power supply. The control circuit has a frequency clock and the power supply has its cleaning conditioner. This speed control comes with Invictus Jr. You don't have to pay extra.

M : Can you give us some suggestions on which tonearm and cartridge will be most suitable on Invictus Jr.?

G : That depends on your budget. TA9000 or TA5000 are good choices. TA9000 is made with 3D printing technology. It has over a hundred joints in the aluminium layer, which makes it very strong without increasing its weight. On the other hand, the arm tube has very good ability to absorb vibrations. We made use of high technology to improve the performance in picking up signals. It would be even better with silver arm cables.

G : We have some cartridges as well, but not real Hi End levels. Frankly, I'm not a specialist in cartridges, so it is better to have a co-operating brand. We tell them what we want, and when we receive the half-finished products, we can concentrate on our turntables and tonearms. The quality of these two products are under our complete control, all parts are made in our own factory. We don't need to buy accessories from other sources except wood. For instance, the surface of the Double X turntable has 10 layers of piano finishes. This process is made by Italian craftsmen who also made cabinets for Sonus Faber. We can't do it, so we ask someone capable to do it for us.

M : What advantages do 3D printing technology in production?

G : For small scale production, 3D printing saves a lot of processes and the cost is much reduced. But, on mass

production, the traditional way is still better with lower cost. However, it still depends on the actual product design. The construction of TA9000 is very complicated, with laser welding and other related technology. It was analysed through finite element for the resonance and optimum damping position. Traditional method can't do that.

M : Does that mean you'll still apply 3D printing technology in the future tonearm design?

G : Yes! 3D technology can make up for the shortcomings of traditional production. But, its finished product has a rough surface which needs final smoothing finish. So, it is by no means simple.

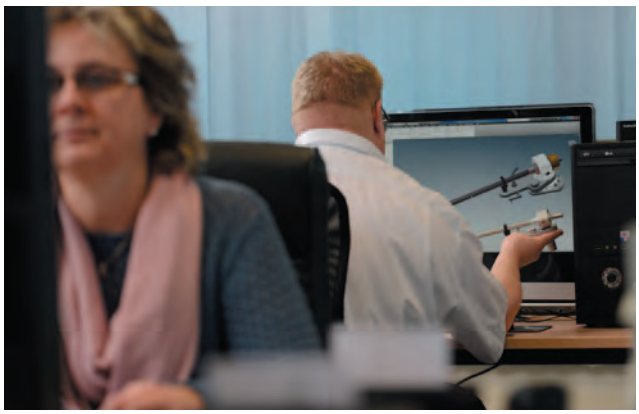
M : Is this technology also applicable to production of turntables parts?

G : Theoretical yes! But the larger the product, the higher its cost and the longer the time taken. Making TA9000 takes 20 hours. In the past years, the cost of plastic 3D printing has dropped considerably, but that of aluminium printing has never dropped. You can imagine what the situation would be in production of turntables. We are one of the few brands who use advanced technology in the production of turntables and we are underestimated in the market. Generally, a company making turntables has 2 to 3 staffs, or 5, to the maximum; we have a total of 22 and that means a big company. We need to maintain a high sales performance so that we can continue to operate. Making expensive products with poor sales won't help. Even we have very expensive flagship models, that does not mean we can make good profit, because it needs very high cost to develop new technologies. For this reason, we have a wide range of turntables of different prices to meet the needs of different customers.

If Acoustic Signature is underestimated, let us have a look at the scale of its factory.

△ Because everything is self-supplied, the machines produce all sorts of parts for the turntables everyday. Each staff in the assembly line has clear instructions of what to do, very disciplined.

△ This is place to put the parts, a total of 3850 spaces, with up to 7000 different parts, including bearings and aluminium chassis.

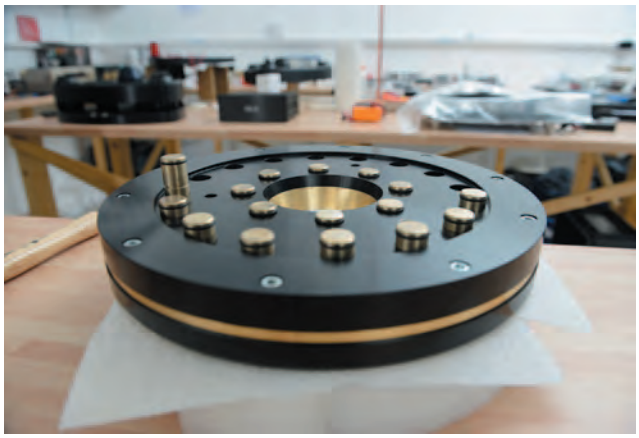


△ 4 engineers are responsible for design work. On the computer with his back to the camera is the boss, Gunther Frohnhöfer. Their daily job is to perform all kinds of designs with 3D drawing programs and finite element method.

△ This is Sabine, she has worked in the tonearm assembly department for 12 years. Each part must pass her careful examination before assembly. This is common in other Hi End factories. On one hand, they made use of hi-tech equipment to produce the parts, on the other, they need experienced staff to final check, both are indispensable.



△ *Manual assembly and examination are important parts in the production process. There are 3 staffs in this department. They need to begin from zero. Part of the job such as checking the conditions before and after a tonearm set up is similar to the end user setting up their arms. They have their specific tools, of course; while audiophiles use different tools of their own.*



△ *Part of the assembly work is to fit the copper bars into the platter. They are fitted in one by one and then the height of each one is checked carefully. It looks very flat and level, in fact, they are hammered in by hand.*



△ *They are quite detailed in the division of work. Peter is responsible for the anti-skating. In addition to that, every adjustment of the tonearm is checked by him. No wonder I found it so easy when setting up the arm, it is because of Peter's fine work, every tonearm is perfect when leaving the factory.*

△ *The last step is playback, to make sure each turntable and tonearm reach the performance standard. This is the combined result of technology and human ear.*

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