



# THORENS TD 309

## TRI-BALANCE TURNTABLE

**P**hew! And I thought that it had taken Thorens a long time to design the TD 309... But then, after investing nearly two years in developing this admittedly unusual turntable, it then took nearly another whole year for the first models to arrive down here in Australia... during which time the TD 309 had won the award for European Turntable of the Year (2010–2011) from the European Imaging and Sound Association (EISA).

### THE EQUIPMENT

One of the prime reasons for the initial delay in production was no doubt the fact that Thorens' CEO, Heinz Rohrer, decided that to ensure a fresh new approach to turntable design, he'd use a different design team, which included freelance industrial designer Helmut Thiele, Karl-Hienz Fink of Fink Audio-Consulting, Steve Harris (former editor of UK magazine Hi-Fi News, but now the director of AudioPlus, a marketing and PR consultancy) and Walter Fuchs (the famous electrical engineer responsible for the phono stage on Magnat's MA-800 valve amplifier, as well as his own range of 'Volpe' phono cartridges), all of whom had previously collaborated on other projects undertaken by Fink Audio-Consulting, but according to Harris, another reason was a decision that before they settled on a particular drive motor, they should first

evaluate 'everything available'. This long search resulted in the TD309 using a low-voltage, d.c. motor rather than the more usual synchronous a.c. motor. According to Harris, this motor's lack of radiated field was one technical reason for its use, but the main reason was for its sound, which Harris described as a 'lack of woomf'. Asked to elaborate, he said of the d.c. motor that *'it not only (had) improved measurements (over a.c. types) but also, more importantly, had sonically a lack of thickness in the lower registers that became known to the team as "woomf" or "lack of woomf".'*

The term 'tri-balance' appears to have been invoked because the turntable sits on three feet, rather than the 'more usual' four. I put that in inverted commas because when Thorens started building turntables, back in the early 1900s (the company has been in business since 1883, but it started out making music boxes, not turntables, which didn't exist back then, so claiming 'analogue high fidelity since 1883 is gilding the lily somewhat!) all turntables had four feet. However, these days, the great majority of high-end turntables have either three feet, or a completely isolated suspension system that is suspended at three points. The reason, of course, is that it's easier to get something supported only at three points steady than it is something that is supported at four points. So 'tri-balance' may sound fancy and high-tech,

but it's really just stating the obvious.

A closer look at the suspension system shows that it's a lot more complex than first appears, because the three 'feet' on which the TD 309 sit are actually all fixed to a plastic beam-support under-chassis, which is also home to the speed selection switch. Then, the main part of the turntable has three spring-suspended 'pillars' that encapsulate the 'foot' sections on the lower plastic section. The springing is highly unusual because it's completely undamped, so that if you give the turntable a 'whack' (with an appropriately-designed and padded turntable-thumping mallet) the entire suspension will continue to oscillate for almost 30 seconds, and for the first ten seconds, it will do so quite violently indeed. However, although it oscillates, it does so vertically—there are no horizontal components, which had me puzzled. This puzzlement disappeared when I took an even-closer look at the feet, because each one has an additional internal 'suspension' not unlike the 'spider' that keeps a loudspeaker cone's voice-coil centred in the magnetic gap. It's this 'spider' that constrains oscillation to the vertical mode. The feet are additionally unusual because the hard plastic at their bottom comes into direct contact with whatever is underneath it. I would have thought that it would have been better to attach some rubber 'feet' to the underside of the plastic.

However, this is just a personal observation—as with all mechanical systems, the proof is ultimately in how well the feet perform their intended function.

The motor is supported in a cut-out in the main part of the plinth first by a plastic ‘insert’ that positions the motor off-centre in the cut-out and then by another ‘spider’ suspension. (It probably won’t come as a surprise that Karl-Hienz Fink is a well-known speaker designer!) The reason for the off-centre placement of the motor is sheer genius. By rotating the plastic insert (after first releasing a locking screw) you can apply tension to the belt, so that as the belt stretches with increased use, you can compensate for the slightly looser fit by rotating the motor assembly to restore the original tension. It’s so simple... and yet so clever. Once properly tensioned, the flat belt (it’s 4mm wide, 496mm long and ground to a tolerance of 0.03 microns) maintains the same path around the motor pulley and the aluminium sub-platter assembly, so speed selection is necessarily electronic. You can select between 33.33rpm and 45 rpm, with an ‘off’ position midway between. The sub-platter sits on an inverted spindle-and-bearing for which the tolerances are ultra-tight—the engineering is superb.

The main platter, which sits on a raised ring at a diameter of 121mm on the aluminium subplatter, (this particular diameter selected by finite element analysis to be at the lowest resonant point of the subplatter) is made from what looks like frosted glass (and in fact most reviewers say that it’s glass in their reviews), but according to Thorens, the platter is actually made from fused silica. Fused silica has a great number of highly desirable properties, which include near-zero thermal expansion, low dielectric constant, low dielectric loss, that it can be lapped and polished to fine finishes (as it is here) and that it’s almost completely chemically inert. (Pedants might argue that fused silica is still a glass, because it’s technically a noncrystalline form of silicon dioxide (quartz, sand) and long-range order in its atomic structure.) To ensure the main platter sits perfectly over the subplatter, Thorens has formed a fairly large hole in the centre of the platter, then fitted a smaller black plastic internal sleeve to make

the link between the fused silica platter and the central spindle. The tolerances on this tiny plastic moulding are also excellent. The only way I was able to ‘improve’ on the fit was with a tiny ‘shim’ made from ultra-thin rice paper, but this ‘tweak’ proved ultimately futile, since I couldn’t hear any discernable difference in the sound with or without the shim.

I had never seen the particular tonearm used on the TD309 before, which was a breath of fresh air. I am getting a little tired of unpacking new turntables which are supposedly fitted with ‘new’ or ‘proprietary’ tonearms only to discover that the tonearm is actually just a slightly modified, re-badged, tonearm made by another manufacturer that can be found as standard fitment on a dozen other turntables. The Thorens TP 92 arm IS new, and was designed by Fink Audio-Consulting. The tubular aluminium arm tube is cold worked and rolled for strength, and then its surface is coated with a material that damps resonances that would otherwise appear in an identical, but undamped, tonearm. The arm allows you to adjust VTA and azimuth angle (rather fiddly to do, but at least you can do it!). Anti-skating adjustment is accomplished magnetically, rather by either a spring or a string-and-weight system. The arm’s high-precision bearings are made for Thorens in Japan. The unique headshell mounts to the cartridge and arm tube separately, which makes cartridge mounting very easy, but also allows 5mm of overhang adjustment. (If you want more, you can eke an additional 6mm of overhang from the bearing end of the tonearm.)

Speaking of the tonearm, Thorens provides a large metal forging that looks like a record spindle weight but isn’t: it’s intended to balance the weight of the tonearm. This seemed odd to me, for several reasons. Firstly, the weight seemed heavier than the arm could possibly be, though I suspect one has to take the moment into account (the tonearm mount being further away from the central point than the weight) but also because since the turntable comes standard with the turntable, it would have made more sense (at least to me) to have incorporated the extra weight into the plinth. However there’s a chance that, while it does ‘balance out’ the

tonearm, it also serves some other purpose that Thorens does not wish to reveal.

I should make a note about the packaging used to ship the turntable, because I wasn’t entirely happy with it. The outer cardboard carton is not particularly robust and inside, in line with European laws, there’s no polystyrene, so all ‘padding’ is provided by folded sections of cardboard, and on my sample, the cardboard had shifted and dislodged the headshell on the supplied phono cartridge. I am all for being green, but surely Thorens could apply for exemptions to packaging laws to allow it to use materials more suitable for protecting such fragile components as phono cartridges, thin-wall aluminium tonearms and fused silica platters?

## LISTENING SESSIONS

Even though three feet describe a plane, so that the TD 309 can never ‘rock’ on its feet if the surface on which it is placed is uneven, you still have to level the turntable if what-

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**Brand:** Thorens

**Model:** TD 309

**Category:** Turntable

**RRP:** \$2,499

**Warranty:** Two Years

**Distributor:** Speakerbits Pty Ltd

**Address:** Unit F51 63 Turner Street

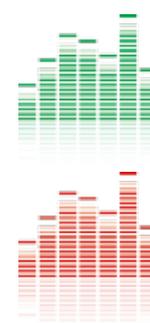
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- Speed accuracy
- Lack of rumble
- Low wow and flutter
- Dustcover
- Feet levelling
- Tonearm adjustments



ever you've put it on is not absolutely level itself (and remember, even if a support table is perfectly symmetrical, it may be your floor that's not level. I once lived in a house where the floor dropped at 1cm per metre, from the front of the house to the back, so in a five-metre run through the kitchen, the floor dropped five centimetres! (This meant the kitchen bench was five centimetres higher at one end than the other, which turned out to be great, because it then accommodated short cooks at one end, and tall ones at the other!)

If the surface on which you place the TD 309 is not level, DO NOT use an Allen-key to try to adjust the feet, this is not what the screw adjustments (accessed through holes in the top of the turntable) are for. Instead, the screws adjust spring tension inside the feet, and this needs to be identical for each foot, so if you wind one out to make the foot 'longer' you'll upset the balance of the turntable. If you need to lift one or more of the feet to get the platter level, you'll just have to put shims under the feet or... better still, correct the level of the surface on which the TD 309 is sitting. Apparently, according to Thorens, the primary reason it's adjustable is so that audiophiles who add a significant weight to the turntable, in the form of a record clamp, or special platter mat, or even a dust cover of some type (because, the TD 309 doesn't come with a dust cover, not least because its unusual shape would mean a very oddly-shaped dustcover, that couldn't be hinged), you can adjust the spring tension accordingly. (Apparently, there should be a 1mm 'gap' visible just above the bottom-most section of the foot.)

Another thing you should NOT do is try to move the 'damper' ring that's approximately in the centre of the tonearm tube. Apparently, Fink Audio-Consulting spent a considerable amount of time with a scanning laser vibrometer to determine the optimum location for this damper (technically, it's

called a compliant mass absorber), so unless you happen to have a scanning laser interferometer handy, I'd recommend leaving it well alone. While I am mentioning the arm, it has an unusual feature: an additional 'ground' wire. According to Fink Audio-Consulting, this 'prevents any current flowing through the tonearm bearings.' You can see the wiring here: [<http://tinyurl.com/TD309>]

I have mentioned the lack of a turntable dust cover. I'd really suggest you try to organise some type of cover for two reasons. One is simply to stop dust collecting on your LPs while you're playing them. As it is, whenever you play an LP on the TD 309, you'll effectively be leaving its surface exposed to the atmosphere for 20 to 30 minutes per side—plenty of time for dust to accumulate. Another useful reason for having a dustcover is that it reduces the level of airborne sound energy reaching the record surface and cartridge... especially if you play at high sound pressure levels. Because of the shape of the TD 309, if you were to organise your own dustcover, I'd get one that goes over the entire turntable, so its edges rest on whatever surface the turntable is sitting on. This means it would be easy to use and would not affect the operation or performance of the TD 309 in any way. And if you left it over the TD 309 when you're not using it, it would itself be completely protected from dust and potential damage.

With so many people buying turntables at least partly for the purpose of 'digitising' an existing LP collection (that is, transferring all their old LPs to electronic files... WAV, MP3, FLAC or whatever, Heinz Rohrer conceived the TD 309 as a 'plug 'n play' turntable, able to be used straight out of the box by users who were not necessarily audiophiles, interested (and experienced!) in the arcana of turntable setup and cartridge/tonearm alignment. To expedite this, the TD 309

comes pre-fitted with a budget 'AT-95B' moving-magnet cartridge. There was no branding on my sample, and Thorens doesn't actually mention the brand in its manual, but it's made by Audio Technica, and is very similar to that company's AT-95E which has received several 'Best Buy' ratings in the UK. Perhaps most significantly, this particular Audio-Technica body is said to be the 'mould' for the highly acclaimed Linn Basik, K5 and K9 phono cartridges.

Rohrer's innovative move has met with some flak from hi-fi reviewers in Germany who, to a man (there were no women!), say the TD 309's performance is more deserving of a higher-quality cartridge. This may very well be true—in fact in my opinion it IS true!—but I think they've missed Rohrer's very valid point. For many buyers, the TD 309 will already be the most expensive turntable they've ever purchased, and they wouldn't be too pleased if they suddenly discovered they had to spend another thousand dollars or so on a phono cartridge, \$170 on a down-force gauge and between \$199 and \$425 on a cartridge alignment tool (the prices for the Align-It and ClearAudio respectively, which are the best available cartridge alignment tools on the market), and then spend several hours learning how to install and align their new purchase. Thanks to Rohrer's initiative, non-audiophile users can be transferring LPs to their hard drives (or just listening to music!) just ten minutes after opening the box.

But what of the sound of the Audio Technica cartridge? While I am sure this opinion will outrage some readers, I'd have to say that I thought the sound quality was pretty damn good!... sure the extreme highs aren't totally transparent, and there's a tiny, tiny suck-out in the upper midrange, but the overall frequency response is extended (and is particularly solid in the bass) and certainly entirely balanced, and the stereo imaging is excellent—almost as good as I've heard even from some of the very best high-end phono cartridges. Tracking ability was fairly ordinary, in that it had difficulty with some of my 'over-the-top' audiophile pressings (from Sheffield etc), but it was good enough that the cartridge had no difficulty tracing the grooves of all the commercial pressings I tried, even to the extent of absolutely sailing through both Emerson Lake and Palmer's first, self-titled album, and their second, Tarkus, which are notable for being engineered with far more bass energy than most ordinary phono cartridges can handle. (The first ELP album is a *tour-de-force*, not least because of the individual musicianship of the band members—particularly Keith Emerson—but also because two of the tracks (*Barbarian* and *Knife Edge*) were at least partly written by those famous rock musicians Béla Bartók, Leoš Janáček and Johann Sebastian Bach.

(For confused readers, *Barbarian* is a reworking of Bartók's *Allegro Barbaro* and *Knife Edge* sounds a lot like a melding of the first movement of Janáček's *Sinfonietta* with the *allemande* from Bach's *French Suite in D minor*, BWV 812.)

So if I purchased the TD 309, I certainly would not be ripping out the Audio Technica cartridge that comes with it any time real soon. I would instead enjoy what is essentially a 'freebie' from Thorens, and use it to rip my vinyl to electronic files, and spend my spare moments imagining which moving-coil cartridge I'd eventually get around to replacing it with some time down the track. One minor grievance here is that because of the unusual tonearm design, you can't easily plug different cartridges in and out of the tonearm, so it would be largely impractical (although certainly possible!), for example, to use a budget cartridge to play your scratched and damaged LPs and reserve an expensive high-end cartridge for your more pristine albums. Still, few high-end tonearms these days have plug-in headshells that would allow this, so it could hardly be levelled as a criticism when talking about the TD 309.

The performance of the Audio Technica was certainly more than sufficient to allow me to completely evaluate all aspects of the TD 309's performance because all of the most important turntable attributes do not depend on a cartridge's technical ability or sound quality at all. Take speed accuracy, for example. You can determine whether or not a platter is rotating at the correct speed by using a strobe card. If you don't already have one, there's a free one available here: [www.avhub.com.au/images/stories/pdf/strobe.pdf] My card showed the platter was rotating slightly fast at both 33.33rpm and 45rpm, so I had to adjust the speed using the two tiny screw adjusters located to the left (for 33.33) and right (for 45) of the speed switch to fine-tune it. Rather confusingly, I found that turning the grub screws clockwise actually *decreases* speed, whereas I would have expected the opposite to be the more natural direction to do this! Also, while making these adjustments, I discovered that adjusting one speed has a tiny effect on the speed of the other, so eventually I settled on getting the 33.33 rpm speed as accurate as I could and settling for the 45 being slightly fast. *Newport Test Labs* later reported that even after my optimal setting, circuit drift (and perhaps the shipping over to the lab?) had subsequently increased the platter speed 0.2% fast at 33.33rpm and 0.3% fast at 45rpm, which they reset before testing. As you can tell from the percentages this is a very tiny error indeed—so tiny that even someone with perfect pitch would be unable to hear the difference—assuming that the recording that was being replayed was actually *recorded* at the correct speed in the first place (a great many LPs are not), so I



wouldn't be overly concerned about trying to keep the platter speed exact: even turntables with a.c. synchronous motors can rarely achieve this!

You also don't need an audiophile cartridge to hear if a turntable has unwanted low-speed variations (known as 'wow') or higher-speed variations ('flutter'). I used the usual music to test for both (slow piano music... I used Erik Satie, but any slow piano music would do) and can report that I heard absolutely no wow or flutter whatsoever. (Again, *Newport Test Labs* measured low levels of wow and flutter—0.06% RMS unweighted/0.05% CCIR weighted—so although you can certainly benchmark their reported results against some other turntable to see which had the 'lowest' levels, the fact is that the levels are so low that you won't be able to *hear* any wow and flutter effects at all—they're below the level of audibility.) If you DO hear some wow and flutter, it will be because the belt is too loose, and in this case all you have to do is rotate the motor in its sleeve until the belt is just tight enough that the wow and flutter disappears—but no tighter!

I also checked for the potential for intermodulation distortion: not by listening, but by 'firing' a laser-beam across the top surface of the platter while it was rotating. This allows me to check the turntable bearing alignment and platter flatness to make sure the platter won't move the arm up and down while it's tracing the record, which would cause intermodulation distortion (IMD). The TD 309 performed brilliantly in this test: the bearing, bearing location and the surface are superb!

Unwanted low-frequency noise (the infamous 'rumble') is the *bête noire* of turntable design, whether it issues from the motor that's driving the platter, or the rotation of the platter bearing itself. It's also extraordinarily difficult to discern the contribution from the turntable itself, because *all* records, even audiophile pressings, contain unwanted low-frequency noise... usually caused by the recording lathe. Because of this, I check

for rumble using acetate (not vinyl) masters specially cut for the purpose, using a filter to remove high-frequency 'surface' noise caused by the stylus travel. Using this set-up I couldn't hear any rumble at all, even when I turned the volume up to well above normal playback levels. As a result of this, I can confidently say you won't hear any low-frequency noise caused by the TD 309 when playing back your LPs, irrespective of whether they're super-quiet audiophile pressings or normal commercial ones.

Turntable isolation (how well it rejects air-borne and/or surface-borne vibrations) is so difficult to consistently and reliably evaluate (the old 'thump the desk alongside the turntable while an LP is playing' test doesn't really cut it) that I hesitate to be too prescriptive about the performance of the TD 309. Overall, however, I'd say that it returned 'better than average' performance within its price class (talking absolutes, Clearaudio's Statement turntable clearly outperforms it!).

## CONCLUSION

The TD 309 is a breath of fresh air from Thorens. This stylish new design is undoubtedly amongst the best-performing turntables Thorens has ever manufactured, and is certainly fitted with one of its best arms ever, yet its asking price is set so far below what I'd have thought Thorens would ask for it that I genuinely wonder if it is being sacrificed as a 'loss leader' to gain some free publicity for the company. If this is indeed the case, and you like the look and sound of the TD 309, I'd suggest you take advantage of the price while you can. And from Thorens' point of view, if you'd like a turntable but want something that looks more traditional, or is lower priced (or, for that matter, higher-priced), the TD 309 has already done its job by gaining Thorens some free publicity (not to mention that EISA award for 'Best Turntable'), so as a result you're probably more likely than you otherwise might have been to look at the dozens (literally!) of other turntables bearing the famous Thorens badge... 

greg borrowman