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THORENS TD115 TURNTABLE/ ORTOFON TPO-70 PHONO CARTRIDGE WAND

Manufacturer's Specifications

TD115 Turntable

Drive System: Belt.
Motor Type: D.c. with 72-pole tachogenerator.
Speeds: 33⅓ and 45 rpm, with electronic selection.
Pitch Control: ±6% illuminated stroboscope.
Wow and Flutter: Less than or equal to 0.05%, DIN 45-507.
Rumble: Unweighted, −48 dB, DIN 45-539; weighted, −68 dB, DIN 45-539.
Dimensions: 17½ in. (445 mm) W × 14 in. (335 mm) D × 5⅛ in. (130 mm) H, dust cover closed; with dust cover open, × 15¾ in. (400 mm) H.
Weight: 15½ lbs. (7 kg).

TPO-70 Cartridge Wand

Length: 8¾ in.
Effective Mass: 7.5 grams.
Offset Angle: 23°.
Skating Compensation: Magnetic force without friction.
Stylus Pressure Appliance: Setting scale on counterweight.

Cartridge Section

Type: Moving magnet.
Output Voltage: 3 mV at 1 kHz, 5 cm per second.
Frequency Response: 20 Hz to 20 kHz, ±2 dB.
Channel Separation: Greater than 25 dB at 1 kHz.
Tracking Ability: Greater than 70 μm, 300 Hz lateral.
Tracking Force Range: 0.75 to 1.25 grams.
Recommended Tracking Force: 1 gram.
Replacement Stylus: D200E.

Price: $435.00.
Company Address: c/o Epicure Products, 25 Hale St., Newburyport, Mass. 01950.
For literature, circle No. 92

Editor's Note: *The new TD-115 II, shown, has 78-rpm speed, a lower wow and flutter spec (0.04% DIN), a heavier mat, and comes in gray.*—E.P.

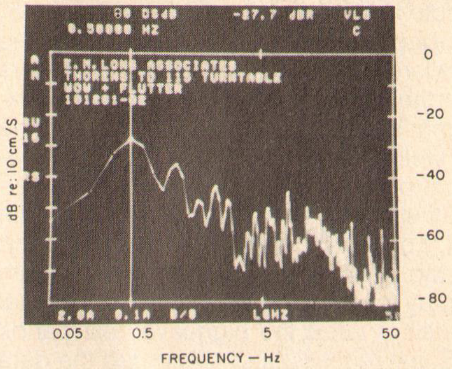

Fig. 1—Spectrum of wow and flutter components. The cursor indicates the output at 0.5 Hz is −27.7 dB relative to a 0-dB reference of 10 cm/S; 0.5 Hz is the rotational speed of the turntable at 33⅓ rpm.

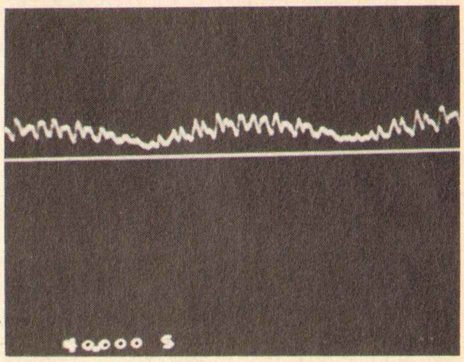

Fig. 2—Long-term change in wow and flutter. Part of the 40-second recording is cut off in this photo. The cyclical rate is about 16 seconds (see text).

Thorens has been making turntables for many years and has achieved an enviable reputation for high quality and reliability, always putting the music first. But their roots are deeper: They started with precision music boxes in 1883 (still made, by an independent offshoot), and cylinder phonographs by 1898. I remember their music boxes from a New York High Fidelity Show in the late '50s, together with the now-classic TD-124 turntable, which established Thorens as "King of the Hill" for knowledgeable audiophiles.

The Thorens TD115 turntable combines proven belt drive with electronic speed control. Thorens has teamed with Ortofon to produce a special low-mass tonearm/cartridge combination, the TPO-70. Ortofon was one of the first to produce moving-coil cartridges back in the late '50s and, at present, makes both moving-coil and moving-magnet cartridges. The TPO-70 combines a moving-magnet cartridge and the forward part of the tonearm to create a "cartridge wand." It plugs into the Thorens tonearm near the arm pillar so that the mass of the coupling ring is closer to the arm pivot, rather than out near the cartridge as in most other tonearms which use conventional headshells. Because most of the mass is near the tonearm pivot, the dynamic mass of the arm-cartridge combination is extremely low. Thorens was the first company to use this concept. The Ortofon cartridge built into the TPO-70 is like Ortofon's "Concorde" series and uses a Concorde stylus.

Many of the features and specifications are shown in tabular form to compare the manufacturer's data with my measurements, but some items are worthy of separate comment. While the report concerns itself with the TPO-70, I also used the TP-70 cartridge wand which accepts individual cartridges such as the AKG P8ES. Thorens supplies a plastic guide which made mounting the cartridge into the wand a cinch. The wand was then plugged into the arm, and a mirror, also supplied, was used to align the stylus vertically, as viewed from the front of the tonearm. Two counterweights are supplied, one weighing 65.6 grams to be used with cartridges such as the AKG P8ES, and one of 33.9 grams for the TPO-70.

The tonearm has spring-suspended jewel bearings, with dual tracking-force calibrations expressed in milliNewtons (mN) and Ponds (p; 1 Pond = 1 gram). Sidethrust calibrations for both elliptical and spherical stylus tips are provided, and sidethrust can be adjusted while listening to a record. At the end of a record, a velocity-type sensing device shuts off the motor and raises the tonearm.

Selector controls for speed, manual versus auto mode, and vertical arm motion are in the form of slide bars mounted on the front of the turntable, which is also the location of the variable pitch control. The turntable and tonearm chassis is suspended separately from the main base by a highly damped system Thorens calls "Ortho-inertial." An aluminum

MEASURED DATA

Model: Thorens TD115
Serial No.: 39965

Specification		Speed	Measured	Comment
Speed Accuracy		33⅓	33⅓	Adjustable
		45	45.5	Adj., 1% fast
Speed Stability		33⅓	±0.27%	Good
		45	±0.035%	Good
Wow	DIN Unwtd.	33⅓	0.18%	Good
Flutter	DIN Unwtd.	33⅓	0.04%	Excellent
W&F	DIN Unwtd.	33⅓	0.18%	Very Good
	DIN Wtd.	33⅓	0.07%	Very Good
Rumble	Unwtd.	33⅓	−50.3 dB	Very Good
	"B" Wtd.	33⅓	−78.2 dB	Excellent
Suspension Resonance				Too low to measure
Platter Resonance			150, 475, 925 Hz	Moderate damping

"The reproduction of extreme low bass was found to be excellent by the listening panel."

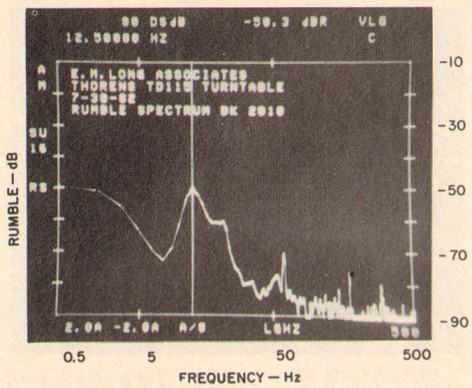

Fig. 3—Spectrum of rumble components, principally at the 0.5-Hz rotational speed and at arm/cartridge resonance. Part of the rotation wow is record eccentricity.

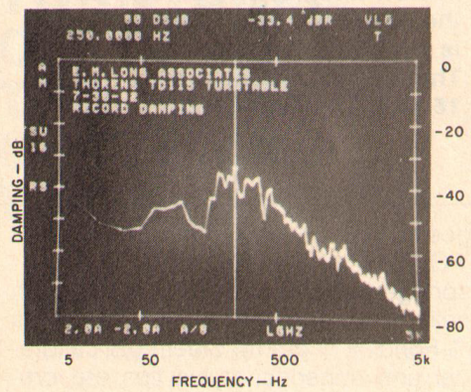

Fig. 4—Spectral components of the output, mainly at 250 Hz, due to a mechanical impulse applied to the edge of a record with the stylus resting in a groove.

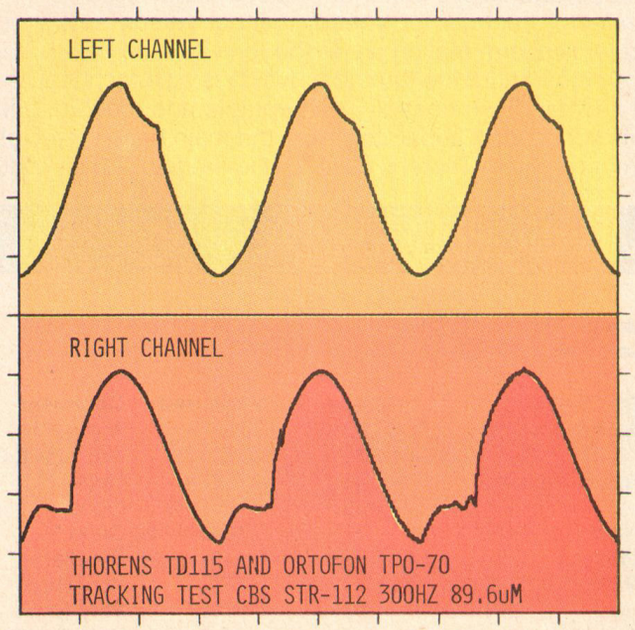

Fig. 5—Tracking of the highest level band on CBS STR-112, 300 Hz, with tracking force at 1.2 g and sidethrust at "4."

disc fits over the spindle and, when reversed, acts as a 45-rpm adaptor. The rubber mat has raised ribs near the center and at the standard 7- and 12-inch record diameters to hold the record off the surface of the mat. Strobe markings for 33⅓ and 45 rpm surround the rim of the platter. The TD115 is very light, weighing only 15½ pounds, and requires only 5.6 watts of power.

Technical measurements were made concurrently with the setup adjustment. For instance, the tracking force and sidethrust were adjusted while observing the output of both channels on the display of the Nicolet Explorer III digital oscilloscope. For signals, I used the high-level test bands on the B & K and CBS test records, and I recorded the data simultaneously on floppy discs. This approach assures that the turntable/tonearm/cartridge combination has been adjusted as precisely as possible so listening evaluation can be made without worrying about possible setup error. It also means I was able to record much more data than is usually published here. The absolute polarity of the cartridge was checked, and it is negative for modulation toward the center of the record.

After the TD115/TPO-70 combination was adjusted and tested in the laboratory, a listening panel was assembled for the subjective tests. In this report, I did not try to separate the two forms of testing but, rather, have tried to correlate them by presenting the technical data along with comments from the panel regarding various aspects of performance.

Figure 1 shows the spectral components of wow and flutter. The vertical cursor at the main component is due to the rotational speed of the record at 33⅓ rpm, which occurs at 0.5 Hz. The wow and flutter figure of −27.7 dB is very low and is partly due to the concentricity of the test record. The flutter components above 50 Hz are not shown, but they were below 60 dB which is also very good. Figure 2 shows the cyclical variation of wow and flutter over time and indicates that it tends to increase and decrease over a 16-second period. This effect has been seen on a number of belt-drive turntables which I have measured and is different from the steady, but faster "cogging" effect measured on direct-drive models. I have not yet been able to correlate these "signature" differences between turntable types with any specific perceived aural effects during the listening sessions, probably because other aberrations are masking them.

Figure 3 reveals the spectral components of rumble. The cursor shows the main component at 12.5 Hz, the frequency of the tonearm/cartridge resonance. The rumble is very low, and no comments were made by the any panel members even though the listening system is capable of uniform acoustical output down to 24 Hz.

When the turntable was reproducing solo guitar, comments were made about a slight tubby quality, and a similar effect was noted on drums and double bass. This perceived effect seems to correlate with the spectrum in Fig. 4, which shows a considerable amount of energy centered around 250 Hz as a result of an impulse test applied mechanically to the edge of a record while the stylus was resting in the groove. Perhaps the addition of one of the new highly damped mats would help reduce this effect. The

"The TD115 has very low rumble, good speed stability and is very simple to operate."

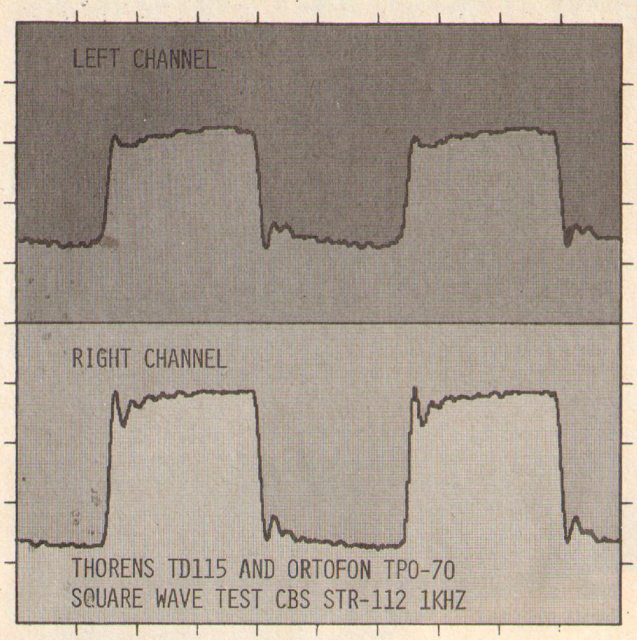

Fig. 6—Square-wave response to band 1 of CBS STR-112, 1 kHz, at 3.54 cm/S modulation in each channel.

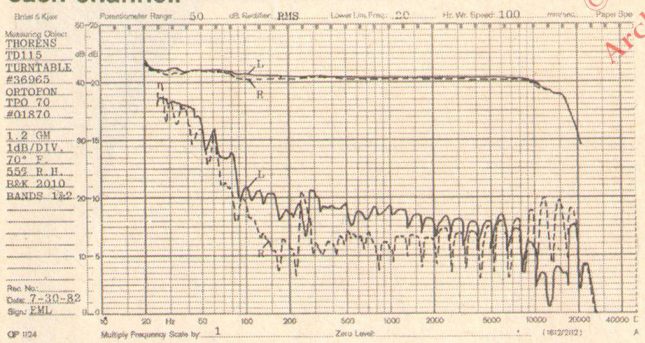

Fig. 7—Frequency response and interchannel crosstalk, B & K 2010.

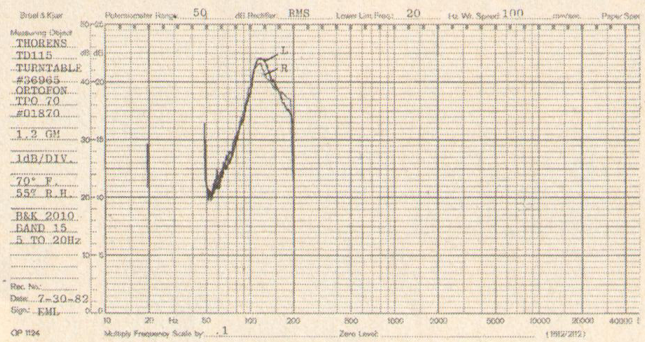

Fig. 8—Low-frequency tonearm/cartridge resonance is at 12.5 Hz with a "Q" of 4.0, B & K 2010.

use of a heavy mat or center weight is not recommended, however, because of the light suspension.

Figure 5 shows the output of each channel while attempting to reproduce the highest level band of the CBS STR-112 test record (a 300-Hz tone at +18 dB relative to a level of 11.2 microns). Although this is a fairly high level, even higher levels can be found on some records and a few members of the listening panel commented on the effects of mistracking. Tests for tracking were also made using the B & K 2010 record, and similar results were recorded for the highest level band.

Members of the listening panel commented on the stereo image and its stability. There seemed to be a shifting in the image, accompanied by a sense of compression, when high-level, complex orchestral passages were played. The extreme high frequencies seemed a bit dull and not as easily localized as the middle and upper-middle frequencies, which were very clear and more precisely positioned. This certainly seems to correlate very well with the information presented in Figs. 6 and 7. Figure 6 shows the output of the left and right channels to the 1-kHz square wave of band 1 of the CBS STR-112 test record. There is a definite difference between the upper and lower traces and, although not shown, the left- versus right-channel response showed considerable phase difference when trying to reproduce this complex signal. The curves of Fig. 7, while indicating remarkably good interchannel balance, show a definite difference in the crosstalk between the channels which changes as the sweep tone goes from low to high frequencies. The decrease in output at higher frequencies can also be seen. Another measurement, not shown in this report, was a rise-time of 32 μS, which corresponds to the rolled-off high-frequency response shown in Fig. 7.

The reproduction of extreme low bass was found to be excellent by the listening panel, and Fig. 7 shows that there is actually a rise in output at the low frequencies. Figure 8, the tonearm/cartridge low-frequency resonance, also indicates a strong low-frequency output. The "Q" of this resonance is quite high, but the response is down considerably at the major warp-induced frequencies, and warped records could be played without groove jumping, mainly due to the low dynamic mass of the combination.

The effect of acoustical feedback from loudspeaker to turntable was checked; it was great enough to recommend that some sort of isolation be considered when setting up. During listening, the unit was mounted on a wall shelf.

The relatively negative comments in this report about the TD115/TPO-70 must be taken in context and balanced with the very positive statements about very low rumble, good speed stability, and simplicity of operation. It should be noted that the listening panel was making comparisons between the Thorens/Ortofon combination and a reference system costing several times as much and considered by some to be the very best available. However, the relative costs of the systems were not considered by the panel, and indeed they were instructed only to make notes concerning the perceived differences in reproducing accuracy. Bearing this in mind, the TD115/TPO-70 combination should be considered as a very good pairing, one capable of very fine performance, and a very good value. *Edward M. Long*