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## THORENS TD 320 TURNTABLE AND TP 16 MK III TONEARM

**Manufacturer's Specifications**  
**Turntable**  
**Drive System:** Belt

**Motor:** Low-voltage, 16-pole synchronous, with two-phase electronic speed control.

**Speeds:** 33 $\frac{1}{3}$  and 45 rpm.

**Platter:** 12-in. (30-cm) diameter, dynamically balanced, zinc alloy, 6.8 lbs. (3.1 kg).

**Wow and Flutter:** 0.035%, per DIN 45-507.

**Rumble:** Unweighted, 52 dB (DIN 45-539), 64 dB measured with Thorens *Rumpelmesskoppler*; weighted, 72 dB (DIN 45-539), 80 dB with *Rumpelmesskoppler*.

**Power Requirements:** 17 V a.c., 140 mA, from external transformer (supplied); rated total power consumption, 5 watts.

### **Tonearm**

**Effective Length:** 9 $\frac{1}{8}$  in. (23.2 cm).

**Effective Mass:** 7.5 grams.

**Stylus Overhang:** 16.4 mm, adjustable.

**Offset Angle:** 23°.

**Lateral Tracking Error:** 0.18°/cm.

**Anti-Skating:** Magnetic.

**Bearing Friction:** 0.15 mN in both planes.

**Capacitance:** 100 pF, including cable.

**Headshell:** TP 63 plug-in wand.

**Cartridge Weight Range:** 3 to 8.5 grams with standard counterweight; up to 12 grams with optional counterweight.

### **General Specifications**

**Dimensions:** With cover closed, 17 $\frac{5}{16}$  in. W x 13 $\frac{3}{4}$  in. D x 6 $\frac{1}{16}$  in. H (44 cm x 35 cm x 17 cm); with cover open, 17 $\frac{1}{2}$  in. D x 16 $\frac{5}{16}$  in. H (44.5 cm x 43 cm).

**Weight:** 24.2 lbs. (11 kg).

**Price:** \$529; optional counterweight, \$10; extra arm wand, \$25.

**Company Address:** Epicure Products, 25 Hale St., Newburyport, Mass. 01950.

For literature, circle No. 92



Thorens, now of Wetztingen, West Germany, has been manufacturing precision record-playing equipment since the turn of the century, and their products have long been favorites of many audiophiles. The TD 320 is a semi-automatic belt-driven machine that falls, pricewise, in the middle of their current line.

The TD 320 is a large and solid turntable that weighs in at just over 24 pounds. The 6.8-pound platter is made of a zinc alloy, and the base is constructed of an acoustically deadening wood material that is said to suppress any resonances that might spoil the reproduced sound. The motor is a low-voltage, 16-pole synchronous type; a separate step-down transformer is provided for the 120-V U.S. standard, and transformers for other voltages are available. Speed selection is electronic.

The Thorens has only three controls on its base: A motor start button, a speed-selection and stop switch, and a tonearm-cueing lever. To play a record, you place the stylus above the first groove, select the proper speed, press the start button, and manually lower the stylus to the record with the cueing device. At the end of each record, the tonearm automatically lifts up and the motor turns itself off. As a safety precaution, the cueing device locks the arm in the up position when the platter is turned off. After years of using completely manual turntables, it took me just a few minutes to become pleasantly reacquainted with the Thorens' automatic convenience and safety features.

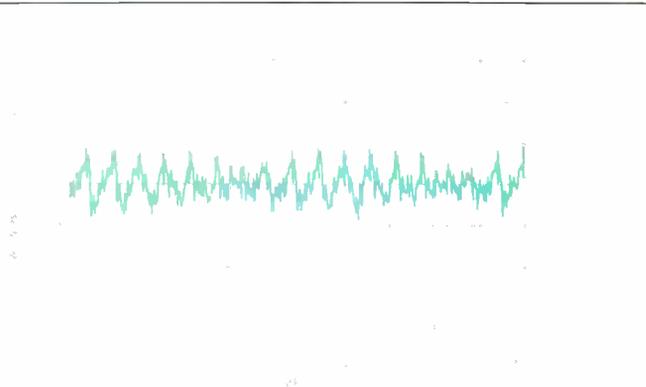
The turntable comes with the Thorens TP 16 tonearm. The Mk III version of this arm, which we tested, uses the Thorens TP 63 cartridge wand, a headshell permanently mounted to a short armtube that plugs into the main arm assembly close to the pivot. Cartridge mounting is via standard, half-inch spacing. The counterweight supplied is recommended for use with cartridges weighing from 3 to 8.5 grams; heavier counterweights for heavier cartridges are available as optional accessories.

The arm is dynamically balanced, with tracking force supplied by a spring. After the arm's counterweight is balanced for a particular cartridge, a knob on top of the pivot assembly is turned until a dial indicates the proper downward force.

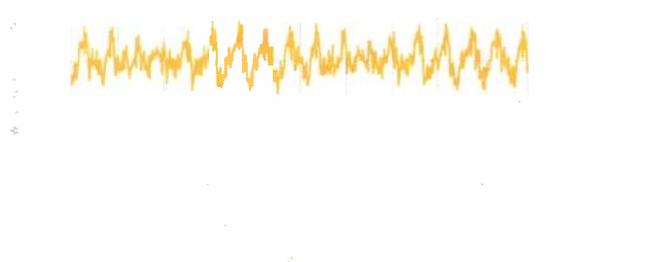
The anti-skating compensation is magnetic, adjusted by turning the control located on the right side of the tonearm. There are calibrated scales on the anti-skating device for spherical or elliptical stylus shapes, and for dry or wet record surfaces.

A plastic gauge is supplied for setting the proper stylus overhang and stylus tracking angle. The TP 16 Mk III has no height adjustment at the pivot, so five plastic spacers are provided for placement between the cartridge and headshell for stylus angle adjustment.

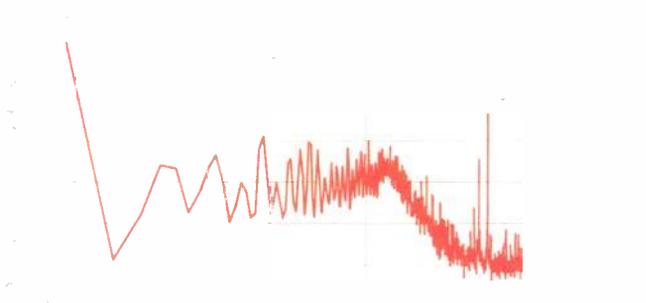
*(Editor's Note: As this review went to press, Epicure announced that the TD 320 is now being supplied with the TP 16 Mk IV arm, which has a nondetachable armtube. For convenience in cartridge mounting, the new arm's headshell can be unlocked and turned upside down. According to Thorens, the Mk IV's fixed armtube is more rigid than the detachable armtube of the Mk III, because the joint between the wand and the pivot assembly is eliminated. The new arm also has a higher effective mass, 12.5 grams, which should*



**Fig. 1—Wow and flutter, DIN unweighted peak, over a 32-S period.**



**Fig. 2—Wow and flutter, DIN weighted peak, over a 32-S period.**



**Fig. 3—Spectrum of wow and flutter from 0.125 to 100 Hz re: 5.0 cm/S at 3.15 kHz.**

After years of using manual turntables, it's pleasant to reacquaint myself with automation's convenience and safety.

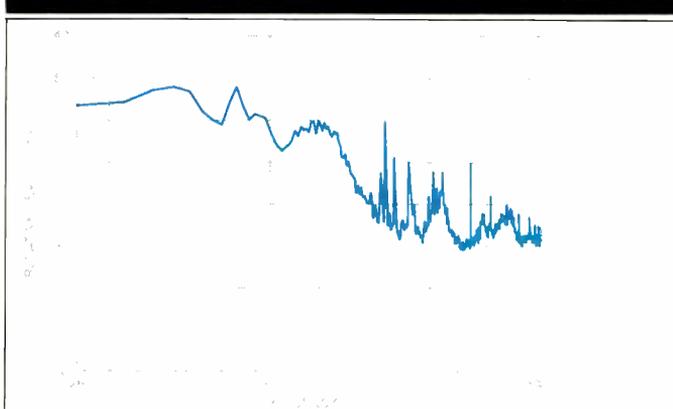


Fig. 4—Rumble spectrum; 0 dB equals 5.0 cm/S.

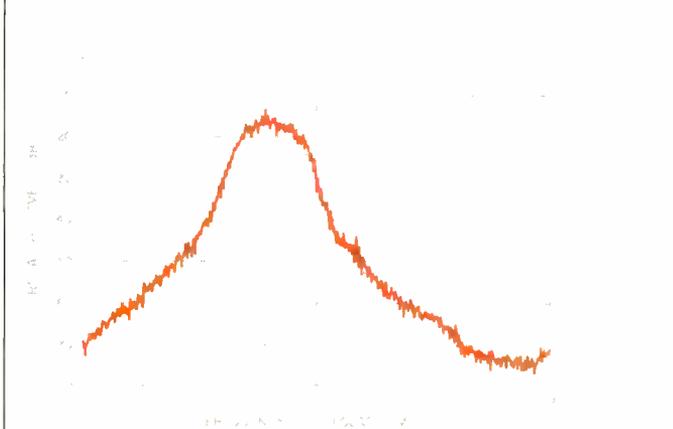


Fig. 6—Speed stability, referenced to 3.15-kHz tone and where 0 dB equals 3.54 cm/S.

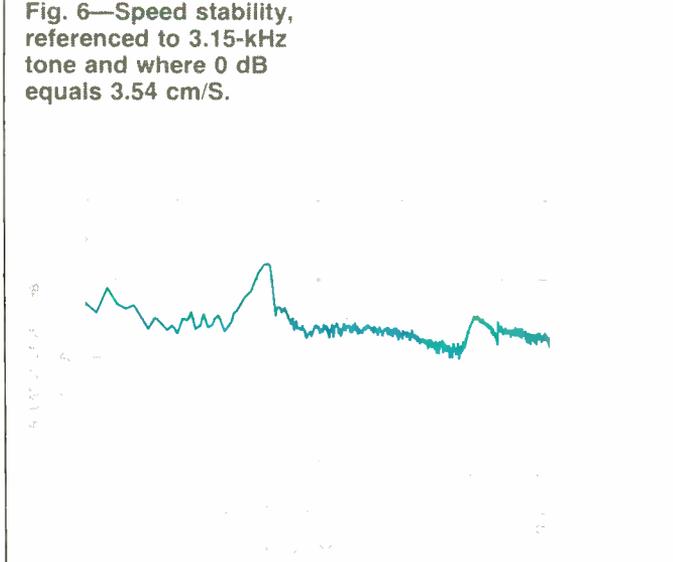


Fig. 7—Suspension resonances from 1 to 100 Hz. The major resonance is at 6.12 Hz. See text.

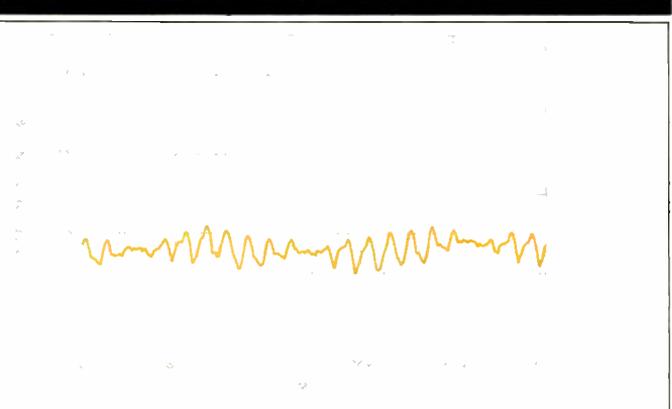


Fig. 5—Speed drift over a 41-S period.

make it a better match for moving-coil and other cartridges of moderate compliance. The Mk IV arm has the same pivot bearings and the same tracking-force and anti-skating systems as the Mk III. The turntable is also available without an arm, as the TD 321, for \$409.)

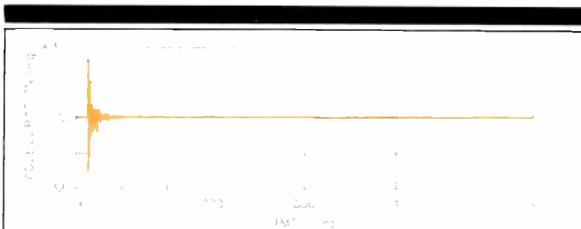
#### Measurements

All measurements were conducted at the CBS Technology Center in Stamford, Connecticut, with a Shure ML140HE cartridge used for the testing. The cartridge features the Shure Dynamic Stabilizer, a combination brush and damping system which helps keep the cartridge stable and the stylus in the groove, and which helps track warped records. The Stabilizer was in use during these tests.

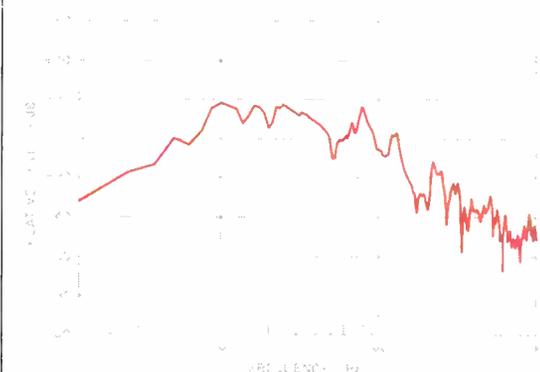
Wow and flutter was measured as  $\pm 0.13\%$  unweighted peak (Fig. 1) and  $\pm 0.08\%$  DIN weighted peak (Fig. 2). Figure 3 plots the spectrum of the measurements by taking the magnitude of the Fourier transform of the flutter output from a wow and flutter meter. Rumble was measured as  $-43$  dB unweighted and  $-76$  dB weighted, using an unmodulated record groove referenced to a 315-Hz test tone. The rumble spectrum is shown in Fig. 4. Turntable speed was accurate, with the TD 320 running 0.2% slow at  $33\frac{1}{3}$  rpm and 1.2% slow at 45 rpm. Speed drift as measured over time (Fig. 5) was negligible. Speed stability is shown in Fig. 6. The test for suspension resonance (Fig. 7), measured by taking the transfer function between a force applied to the turntable platter and an accelerometer mounted on the platter, shows the primary resonance occurring at 6.12 Hz. This is close to record warp wow frequencies, which are most frequently in the range from about 4 to 6 Hz.

Figures 8 and 9 show the response to a mechanical shock applied to the platform upon which the TD 320 was resting. Figure 8 shows the output of an accelerometer when the platform was vertically struck with a hammer close to the turntable base; Fig. 9 shows the output of the cartridge caused by the same hammer strike. A frequency spectrum of the output caused by that same hammer strike (Fig. 10), as well as measurements taken when the platform was struck in and along the horizontal plane of the turntable, show the turntable/cartridge combination able to achieve very good mechanical shock isolation.

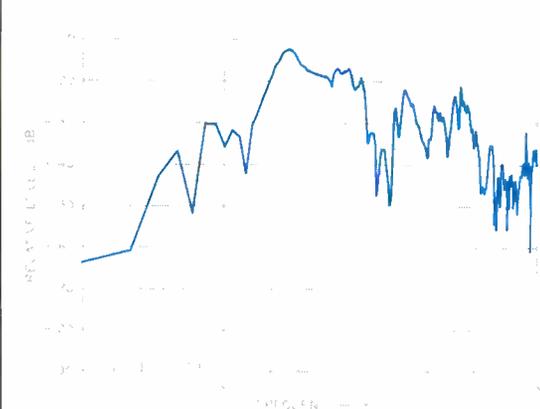
The TD 320 gave me flat, extended highs, a smooth midrange, rock-solid imaging, and excellent isolation from feedback.



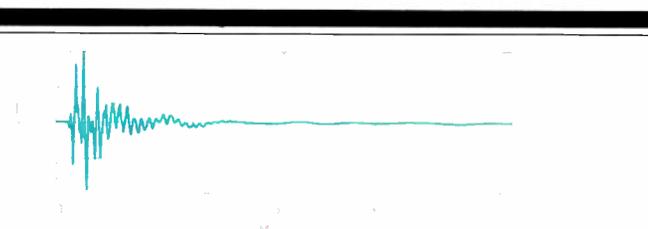
**Fig. 8—Accelerometer output vs. time for a vertical shock applied to the turntable base.**



**Fig. 10—Spectrum (to 1 kHz) of output from impulse of Fig. 8, where 0 dB equals 1 cm/S per 1 g.**



**Fig. 11—Isolation from airborne sound is indicated by this spectrum (to 1 kHz) of vibrations from a 100-dB SPL acoustic field near the record surface, with stylus resting in a groove. Reference level (0 dB) is 1 cm/S per 1 dB SPL.**



**Fig. 9—Cartridge output vs. time for the vertical shock of Fig. 8.**

The CBS Technology Center also measured isolation from airborne sound. Figure 11 shows the difference between the output of a microphone placed near the platter and the cartridge output with the stylus resting in a groove and a 100-dB SPL acoustic noise signal applied near the platter surface.

The TP 16 Mk III's stylus tracking-force adjustment was checked against a separate gauge and found to be quite accurate.

#### **Use and Listening Tests**

Setup of the Thorens is fairly straightforward and simple, even for beginners. The instruction manual is easy to understand and follow. The only adjustment I would have liked to change was that for the stylus vertical tracking angle. Separate tonearms allow you to change this angle by altering the height of the tonearm itself at the pivot point. This integrated tonearm has no pivot height adjustment; all height adjustments are made at the headshell. When mounting a cartridge, you must guess which spacer or combination of spacers must be used to obtain the proper height. If you're mistaken, the cartridge has to be demounted and the process started again, a time-consuming and often frustrating task. In defense of this system, the cartridge height will remain correct once adjusted, even after changing tonearm wands. All other adjustments on the TD 320 are simple, and this is one of the few tonearms I've worked with recently whose lift mechanism needed no adjustment in order to work properly.

Once set up, the Thorens TD 320 provided a large degree of enjoyment in my listening room. I used many cartridges in my evaluation, but the Shure ML140HE was deemed typical of what might be matched to the Thorens in a home setup. On all types of music, this playback system gave a fine accounting of itself, providing rock-solid imaging, smooth midrange, and flat, extended highs. Deep bass from the Thorens was not as good as from my reference system. On the other hand, due to the TD 320's excellent isolation, at no time did I hear any acoustic feedback, even when listening at high volume levels and despite the turntable's close proximity to my loudspeakers.

As a medium-priced turntable and arm combination, the Thorens TD 320 provides proof that the black vinyl disc can still provide a measure of high-fidelity reproduction in the home, and that LPs haven't yet been killed off by CDs.

Gary Krakow