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LUXMAN PD-375 TURNTABLE

Manufacturer's Specifications
Speeds: 33⅓ and 45 rpm.
Wow & Flutter: Less than 0.03% wtd. rms.
Rumble: −70 dB (DIN B).
Arm Type: Straight static-balance.
Cartridge Weight: 5 to 10 grams.
Stylus Force: 0 to 3 grams.
Dimensions: 14.6 in. (37.08 cm) W × 6.4 in. (16.25 cm) H × 13.9 in. (35.30 cm) D.
Weight: 23.1 lbs. (10.39 kg).
Price: $599.95.

About two years ago, Luxman demonstrated a unique turntable that featured a built-in vacuum pump which pulled the record firmly to the platter. Its price of about $2,900 was a bit too steep for many would-be owners, but the company recently introduced a far less expensive model, the PD-375, which costs $600. With some justification it is claimed that proper interface between the record and platter lowers distortion, reduces resonances, as well as inhibits acoustic feedback.

We know that every action causes a reaction, and this applies to the behavior of a phono cartridge stylus in a record groove. This reaction produces some energy which is either dissipated as heat or is passed in some form back to the stylus. A soft mat can absorb most internal reflec-

The PD-375's ingenious vacuum pump system uses a platter constructed like a sandwich with an air space between the two sections.

tions, but it is not easy to find a material having the same characteristics at all frequencies as well as one that provides a close contact—hence the growing popularity of record clamps.

All the foregoing might seem rather academic to the hardened cynic, but it must be remembered that the modulation in the record groove is comparable with the wavelength of ultraviolet light, that is, incredibly small. This was highlighted at a seminar conducted by Discwasher some months ago when Bob Pruitt said that the noise floor of a really good record is −70 dB at 1 kHz. However, on examining an EMI recording of *Scheherazade*, it was found that at one point a violin plays a fundamental of 900 Hz with harmonics extending all the way up to the 19th at 17.1 kHz. The amplitude was −57.6 dB with a peak-to-peak value of 34 billionths of an inch! The amazing thing was that the 19th harmonic was not visible on a 2000× electron microscope, although it was well clear of the noise floor and was picked up by the stylus.

Now back to the PD-375 and its ingenious vacuum pump system. The platter is constructed like a sandwich with an air space between the two sections. The bottom section has a neoprene, corrugated surround, permitting it to move. If the lower section is pressed hard enough, air is expelled from two small holes in the top platter; if the lower section is pulled back, the air is drawn in, causing a suction which is sufficient to bond a record tightly. When the Start button is depressed, two rollers move out to pull the lower section down. At the end of the record, the rollers move out again and push the section back. It sounds quite simple, but obviously a lot of thought has been given to the design of this mechanism.

The platter motor is a d.c. slotless direct-drive type, servo-controlled with a quartz reference. Weight of the aluminum diecast platter is 6 lbs., and it has a mirror-finished edge which looks most attractive. The arm is a straight type, measuring 9.05 inches from pivot to stylus, constructed from tubular aluminum. Tracking force is set by a calibrated rear balance weight, while a wire and weight "outrigger" adjusts the anti-skating force. Both arm and motor are mounted independently from the top panel, which extends over the front. This panel is a satin-finished aluminum, making a pleasant contrast to the two rosewood sidepieces. All controls, apart from the anti-skating device, are accessible with the dust cover closed, and they are as follows: Combined on-off and speed selector, function switch (Repeat, Auto and Auto-Lift Off), vacuum on, vacuum off, and a dual-function button marked Start/Cut. This last button works in conjunction with the function switch—the Repeat is obvious, tonearm motion is back to its rest if Start/Cut is pushed while the function switch is turned to Auto, and the arm simply raises up off the record, as with an ordinary cueing lever, if the function switch is in Auto-Lift Off.

The VDS (Vacuum Disc System) is activated by pressing the VDS On button to start the pump. If the VDS Off button is pressed immediately after using the Start switch, however, a memory circuit triggers the mechanism to release the air when the arm is back in its rest position. Since the VDS cannot function with badly warped records, the turntable comes with a 12-inch plastic wheel which fits over the center spindle. The record can be gently pressed down by hand until the vacuum takes over. Also provided is a heavy rubber platter mat which accommodates 7- and 10-inch records.

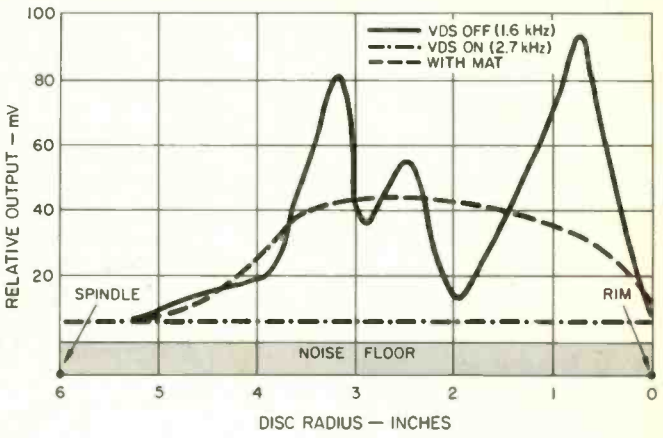

Fig. 1—Effects of a radiated signal on a record.

Measurements

For test purposes, an Empire 600 LAC cartridge was mounted on the low-mass shell, which does not have the usual termination wires because the plug connections are at the end of the arm itself. The shell is mounted securely on the arm by means of a split clamp and screw, a method which has some advantages although extra care must be taken to see that the cartridge is level. Tracking force was set to 1.7 grams, and the anti-skating weight moved to the 1.8-gram position. The initial tests were made with the VDS switched off. The records rested on two neoprene rings, one at the rim and the other about 3½ inches in. Thus, there was about one-tenth of an inch air space immediately under most of the record. The rings, or seals, are mounted in such a way that the application of the vacuum enables the record to push the rings down below the level of the platter so the disc is perfectly flat. The results of the initial tests were: Rumble, 62 dB (ARRL); wow and flutter, 0.045% (DIN 45-507), and arm resonance, 8 Hz with a rise of 4 dB. The measurements were repeated with the VDS switched on, but there were no significant differences. Tracking weight calibration was within 5% in the 1 to 2 gram range, and tracking error was +2° and −1½°, using a Cart-A-Lign two-point gauge. Speed was less than 0.1% fast.

Next, some equipment was assembled to see how the VDS would affect the resonances of a record. A loudspeaker was mounted 20 inches above the record and fed with a swept-frequency signal. Instead of using the time-honored lycopodium powder method to show the various modes, the cartridge was placed on a stationary record, and the induced output measured. The upper curve of Fig. 1 was taken at the most significant mode frequency of 1.6 kHz with the VDS off; note that there are three peaks of

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0.75, 2.5, and 3.3 inches from the rim. Switching in the VDS damped all high-frequency modes, and output from the cartridge was in the noise floor. The mat also provided an appreciable amount of damping, but the main resonant frequency was raised to 2.7 kHz. Output from the driving loudspeaker was kept to a level of approximately 100 dB SPL at the record, and the highest peak in the 1.6-kHz mode (VDS off) was 30 dB below a reference signal of 3.54 cm/S from a standard test record.

As the initial tests were made with a stationary record, I decided to repeat them with a record turning at 33⅓ rpm. Using an unmodulated record (not easy to get!), the results were substantially unchanged. It is true that SPLs of 100 dB are not terribly likely to impinge on a record—except in a disco—but music peaks of only 80 dB were easily detected with the VDS off. The mat was very effective in absorbing these signals, but it is quite possible that some breakthrough could occur with a poorly designed mat, causing a smearing effect. (This is why most turntables now have fairly solid mats instead of the ribbed designs with air pockets, which could form miniature Helmholtz resonators.)

Although external excitation does give a clue to internal damping, I felt impluse testing might provide further information and so conducted some experiments using 4-Hz pulses obtained from a suspended ball driven by a transducer. The results were predictable: A single pulse followed by a train of pulses with the VDS off, a single pulse with the VDS on, and a trace of ringing when the mat was used.

Use and Listening Tests

Listening tests were made with a wide variety of records, and I found the effect of the VDS to be quite subtle. Vocals seemed to sound more natural, with less sibilance, while complex orchestral works sounded cleaner and more detailed. The flute and orchestral bell sections on the Shure—Era IV test record appeared to have an extra clarity, a kind of firmness.

Operation of the Luxman PD-375 is quite simple. After a touch of the VDS button, a whirring noise is heard, followed by a definite "thunk" as the record is pulled in. Suction is maintained until the end of play. In fact, the record cannot be removed unless the release button is depressed. As mentioned earlier, this can be done after the Start button is depressed, and the vacuum will then be released automatically when the arm returns to its rest. The unit is reasonably free from acoustic feedback thanks to the efficient arm and motor suspension system plus the four resilient feet.

In sum, the Luxman PD-375 is a handsome turntable with good basic wow and flutter and rumble performance, combined with a nearly unique feature, the vacuum platter.

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