

Luxman Model K-12 Cassette Deck



Manufacturer's Specifications

Frequency Response: Normal tape, 30 Hz to 16 kHz; CrO₂ tape, 30 Hz to 20 kHz; metal tape, 30 Hz to 21 kHz.

Harmonic Distortion: 1.2 percent overall, 0.3 percent HDL₃.

S/N: 56 dB; with Dolby NR, 65 dB; with NR and metal tape, 69 dB.

Input Sensitivity: Mike, 0.25 mV; line, 100 mV; DIN, 30 mV.

Output Level: Line, 580 mV; head-phone, 1 mW at 8 ohms.

Flutter: 0.04 percent W rms.

Dimensions: 17¼ in. (438 mm) W x 14 9/16 in. (370 mm) D x 5 in. (126 mm) H.

Weight: 23.1 lbs. (10.5 kg).

Price: \$995.00.

Lux has shown with many products that it offers high quality for a premium price. The K-12 cassette deck is no exception, though a prospective buyer may be reluctant to spend this sum for a two-head deck. However, this unit provides performance and features that are quite worthy of attention. The front panel is a very attractive one, and the black designations are most easy to read against the brushed aluminum. The cassette compartment almost seems to dominate, probably because the removable door (for cleaning, etc.) is all clear plastic, without any overlying plates. It is easily lifted out, and then the solid, rugged head-support base can be examined. It was judged superior to substantially all other cassette-deck head supports, more solid than many open-reel head assemblies. This is one of the extra-high-quality items that increases the cost, and the value, of the K-12.

To the right of the tape compartment are the very light-touch tape-motion plate switches. Everything is logic controlled, and all combinations of switching are possible, in-

cluding the desirable flying-start recording. The arrangement of the rectangular switch plates is not a standard one, but it seemed quite sensible in use, aided by the status lights with *Rec*, *Play*, and *Pause*. The optional AK-1 remote control, which was supplied with the deck, repeats the layout of the main unit exactly, although it does not have status lights for *Play* or *Pause*. It does add facilities, with *Auto Play* and *Rewind* buttons, for all combinations of rewind and play, play and rewind, singly or continuously, and sometimes in conjunction with use of the counter memory button on the deck.

Also on the right side of the front panel are the two dual-concentric mike and line level pots, with mixing capability. The left-section knob is of medium diameter, and the right one consists of a recessed ring with a tab index which extends a short distance out from the panel — a design which might make fine adjustment a bit difficult. The fluorescent peak indicating bar graphs are the most obvious feature of

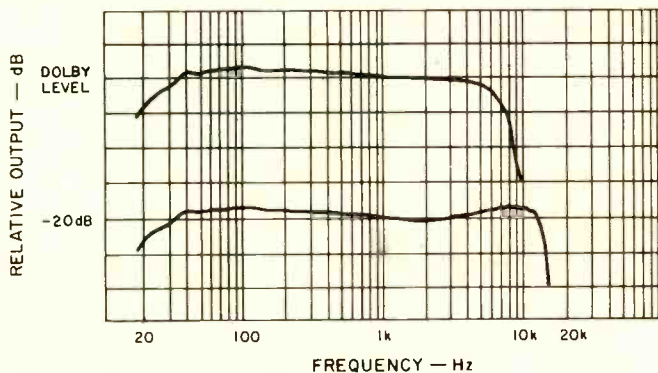


Fig. 1 — Frequency responses in Dolby mode with TDK AD tape.

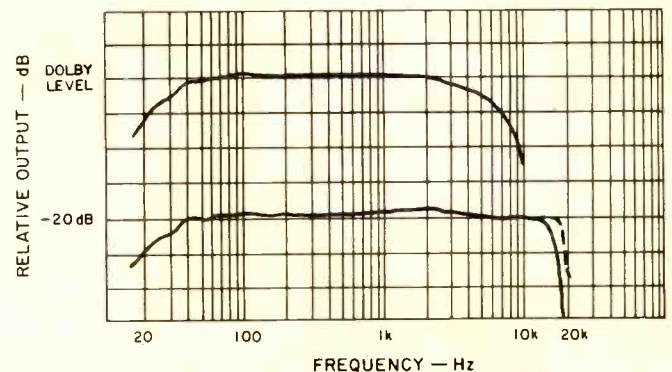


Fig. 2 — Frequency responses in Dolby mode with Luxman XM-II tape; response without Dolby NR is shown by dashed line.

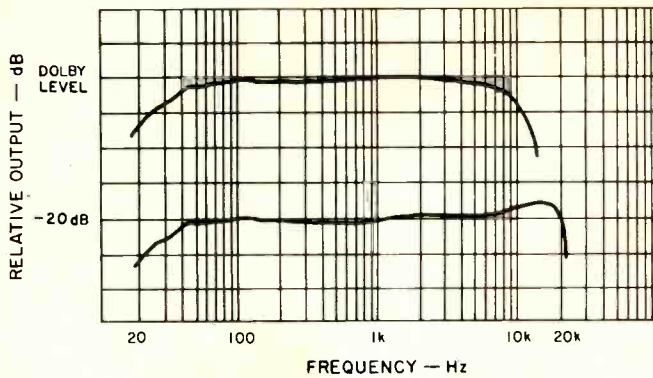


Fig. 3 — Frequency responses in Dolby mode with Luxman XM-IV tape.

the left side, particularly when on and responding to music. They are scaled from -40 to +6, and there's a lower scale that's shifted 4 dB to show up to +10 dB for metal tapes. The display has 24 bars per channel, giving much better resolution than many others of this type. There are single-dB steps from -6 to +6 dB, or from -2 to +10 dB for metal tapes, and a peak hold switch for retaining the highest record (or play) level during any desired period. The counter display is unusual in that it has four 7-segment digits. With most cassettes, it offers the advantage of a high count with more accurate positioning than other decks. When Lux cassettes are used, the counter becomes a tape timer (unless cancelled by a back-panel switch), and it shows tape position in minutes and seconds. This is another higher cost function which could be of great value to users.

Table I—Record/playback responses (-3 dB limits).

Tape Type	With Dolby NR				Without Dolby NR			
	Dolby Lvl		-20 dB		Dolby Lvl		-20 dB	
	Hz	kHz	Hz	kHz	Hz	kHz	Hz	kHz
TDK AD	25	6.9	22	15.0	25	7.2	22	16.1
Luxman XM-II	30	5.0	25	16.0	30	5.6	25	19.3
Luxman XM-IV	35	9.0	26	21.0	35	9.3	26	22.2

Four three-position rotary switches with easy-turn bar knobs provide selection for *High, Low or EX* (metal) bias; *CrO₂, Normal or EX EQ*; timer *Rec, Off or Play* and Dolby *NR On, Off and On with Filter*. The output pot has the same type of knob. The counter reset and memory on/off are small push buttons. In this same section of the front panel are the jacks for headphones and left and right microphone inputs. The eject button is next to the tape compartment. The stereo line-in and line-out phono jacks are on the rear panel, along with a DIN socket, a ground post, and a multi-pin remote-control socket.

Removal of the wraparound top and side cover revealed many examples of attention by the manufacturer to quality materials and construction. Soldering on the p.c.b.s was excellent, with very little flux residue. Interconnections were made with wire-wrap, and some wires were bundled a little loosely with many cases of slack evident. It appeared to be purposeful, and such slack can be a great aid to some service tasks. (There was no evidence in later tests of crosstalk or noise pickup.) All parts were of excellent quality, and the adjustment pots were quite superior to those usually used. All parts and a number of functions were clearly identified. The two-motor drive and the solenoid positioner were of solid construction, and steel was used for a good part of the chassis. The power transformer was much larger than many seen in the past; there was a power line fuse in a clip.

Performance

The play responses were checked with TDK and BASF test tapes. The results were excellent, in general, with just a bit of droop with 70- μ S EQ at the highest frequencies. Level indications with the standard tapes were about a dB low for left and very close for right. Record/playback performance was very good with the Maxell UD-XL I, Lux XM-II, and Lux XM-IV supplied with the deck. Results were comparable with TDK AD, Sony SHF, Memorex MRX₃, Realistic Supertape Gold, Maxell UD-XL II, and TDK MA-R. Testing was continued with the supplied tapes with the exception that TDK AD was used in place of the Maxell because its response was a little flatter. Figures 1 to 3 show the responses with the three tapes used at Dolby level and 20 dB below, both in Dolby mode. This is a demanding way to conduct these tests, as specifications are for performance without Dolby NR. As Table I shows, the biggest discrepancy was with XM-II tape and Dolby NR. Without NR, it was very close to spec, as listed in the table and shown in Fig. 2. Phase jitter was very low, less than 20 degrees with a 10-kHz test tone. Bias in the output during recording was also very low. The multiplex filter response was down 1 dB at 15 kHz and over 33 dB at 19 kHz.

Other tests were run with the Lux cassettes as they incorporate two special features. The first of these is a precision roller with a reflection plate which, in conjunction with a light source and detector, provides a means of measuring tape speed and, thereby, time. The K-12 display showed "10:00" in "10:02" actual, which was exactly consistent with the results of the tape speed test, indicating the deck to run about 0.3 percent slow. The scheme worked very well with no apparent slip, or missed counts, from fast winds. This feature has great potential and should find favor with those who need to time recordings. The Lux cassettes also have skew adjusters for both play and record and for both sides of the cassette. The play skew would be adjusted for best results with a tape that had been recorded on another deck. Record skew would be adjusted on a three-head machine, rather than adjusting the record head itself. Play skew could be adjusted ± 270 degrees with a 10-kHz tone. Record skew had a range of ± 100 degrees. There was interaction between sides of the cassette if the adjustments were more than minor. There is a *possible* advantage to having skew adjustments in a cassette, but misadjustment could lower performance. My own hopes are for better tape production, head alignment, and tape guiding so that there will be minimal variations in tape skew without cassette adjustments. Some tapes are very

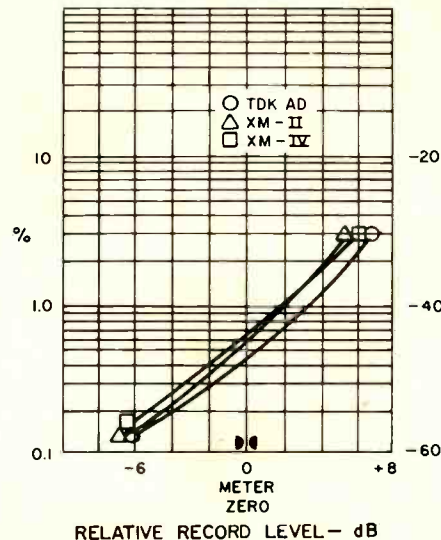


Fig. 4 — Third harmonic distortion vs. level in Dolby mode at 1 kHz with TDK AD, Luxman XM-II, and Luxman XM-IV tapes.

good in that respect now. I find nothing to fault in the tape-time scheme; it should be used by others.

Figure 4 shows the results from measuring HDL₃ at 1 kHz over a range of record levels in Dolby mode for the three tapes. The distortion levels are quite low, with high record levels to reach the three-percent distortion limit. At the lowest levels, there was some flattening of the curves, indicating the possibility of some distortion in the electronics appearing at about 0.1 percent. HDL₃ over the frequency band at a level of -10 dB with XM-IV metal tape is plotted in Fig. 5. The results are quite good, though the distortion is higher than what has been measured with metal tape on three-head machines. With the high maximum record levels and the low machine noise, excellent signal-to-noise ratios were obtained with all three tapes. As shown in Table II, the chrome-type XM-II matches the metal tape, and TDK AD isn't far behind. Erasure of the XM-IV metal tape at both 100 and 1000 Hz was at least 75 dB, excellent performance for the erase head. Separation between tracks was a very good 44 dB, and crosstalk was way down, 75 dB or more.

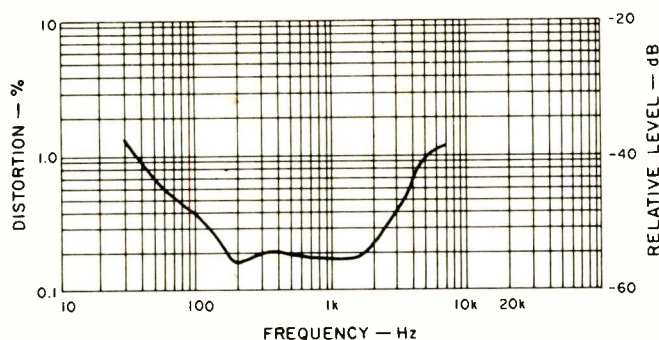


Fig. 5 — Third harmonic distortion vs. frequency in Dolby mode at 10 dB below Dolby level with Luxman XM-IV tape.

The input sensitivity was 0.29 mV for mike and 97 mV for line. Input overloads were 18 mV for mike and 28 V for line. The output clipped at a level equivalent to +10.1 dB on the meter. The mike and line input pot sections tracked within a dB from maximum down at least 65 dB, outstanding performance. The line output was 570 mV at meter zero, just slightly under spec. The pot sections tracked within a dB down from maximum for 65 dB, great again. Drive for headphones with an 8-ohm load was 300 mV (11 mW) which drove all phones used to high levels. The peak-responding displays were very fast and were only a dB down with a 1-mS tone burst. They were down about 5 dB with a 0.5-mS burst. Response to 0 dB and a peak-hold required a 2-mS burst. Even without the peak-hold being used, the individual peaks automatically held for about 2 seconds. This was of definite aid as the 0.7-S decay would have been too fast without the short hold. The calibration of the scales was very accurate from -10 to +6 dB, but there were errors at the lowest levels, with "-40" actually 30 dB down. The displays were easy to read and had a high intensity level. When switched to EX (metal) tape, there was

Table II—Signal/noise ratios with IEC "A" and CCIR/ARM weightings.

Tape Type	IEC "A" Wtd. (dBA)				CCIR/ARM			
	W/Dolby NR		Without NR		W/Dolby NR		Without NR	
	At DL	HD=3%	At DL	HD=3%	At DL	HD=3%	At DL	HD=3%
TDK AD	60.8	67.8	52.4	59.4	57.6	64.6	50.3	57.3
Luxman XM-II	62.8	68.3	55.8	61.3	60.5	66.0	53.0	58.5
Luxman XM-IV	62.2	68.4	54.2	60.4	59.1	65.3	52.6	58.8

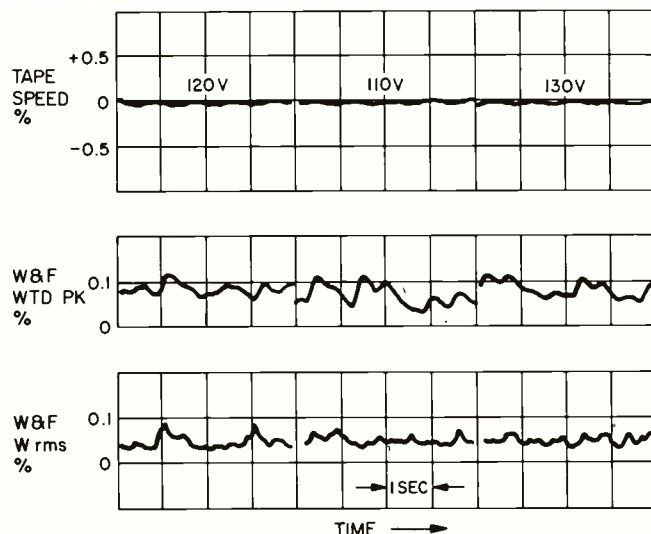


Fig. 6 — Wow and flutter (three trials) and tape play speed vs. time and line voltage.

an automatic switch in displayed level to match the second scale.

Typical flutter values were 0.045 percent W rms and 0.08 percent weighted peak. This is slightly over spec, but very good just the same. There were minor variations in tape speed with steady line voltage, and there was substantially no change in speed with changes in line voltage as shown in Fig. 6. Fast wind time for a C-60 cassette was about 64 seconds. There was a 3-second delay from tape run-out in play or wind to mechanism shut-off. The time required to change wind directions or to switch from fast wind to play was noticeably less than a second.

In-Use Tests

The tasks of cassette insertion and removal, cleaning, and demagnetization were all easily done. The counter reset to zero automatically upon removal of the cassette, although I would have occasionally preferred having the option of keeping the reference. The real-time display with the Lux cassettes was very useful a number of times. All controls worked very well, and there was no malfunction of any type. It took but a short time to feel quite at home with the K-12's arrangement of tape motion switches. I did work out a way of holding the tab of the right-channel input pot section for fine balancing, but for me it remained a fussy operation. The peak hold feature was used a number of times to check an entire piece of music for the maximum levels without having to watch continuously.

The instruction book has very good illustrations, and the text covers everything well, although there were a few examples of translation oddities. Various sources were recorded, including a broadcast of the works of Finnish composers and recordings of a few different orchestrations of Moussorgsky's *Pictures at an Exhibition*. It was quite easy to set levels as high as possible without noticeable distortion with the aid of the peak-responding display. Clicks or other noises from record, pause or stop were very low, with changes in tape noise almost undetectable with ear or meter.

The Luxman K-12 provides a level of performance that should appeal to most audiophiles. There would be some improvements, of course, in a three-head design. For the prospective buyer looking at high-quality decks, the K-12 has a number of worthwhile and interesting features and offers solid, premium-quality construction with the look of long-term reliability.

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