

Kenwood Stereo Cassette Deck, Model KX-710



MANUFACTURER'S SPECIFICATIONS

Frequency Response: Low-noise tape, 30 Hz to 13 kHz; CrO₂ tape, 30 Hz to 16 kHz. **Signal/Noise Ratio:** 50 dB; 58 dB with Dolby and CrO₂ tape. **Input Sensitivity:** Line, 77.5 mV at 470k ohms; mike, 0.24 mV at low impedance. **Bias Frequency:** 85 kHz. **Wow and Flutter:** Less than 0.13%. **Motor:** DC servo. **Output Level:** Line, 490 mV. **Fast Forward and Rewind Time:** Less than 75 sec. (C-60). **Dimensions:** 15 7/8 in. W. x 5 in. H. x 9-15/16 in. D. **Weight:** 11.7 lbs. **Price:** \$249.95.

The Kenwood KX-710 cassette recorder offers a number of attractive features at moderate cost. One that is immediately apparent is the inclusion of good-sized, easily-readable VU meters mounted on an inclined panel at the back of the recorder. The scales are printed on translucent plastic illuminated from behind. This combines excellent readability with tasteful appearance. On the same panel are indicators for *Peak*, *Record* and *Dolby*, a 3-digit counter with reset button, and a moving tape-run indicator. Tape is inserted by placing it in a raised tray within the cassette well. It can then be positioned for playing by pushing down directly on the cassette, or on the outside plastic cover. In front of

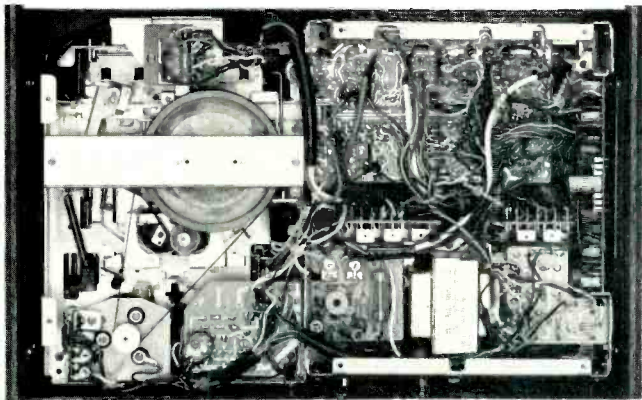


Fig. 1—Internal view.



Fig. 2—Back panel view.

the well are the *Eject*, *Stop* and *Pause* buttons.

Four piano-style keys control *Record*, *Rewind/Review*, *Play* and *Fast Forward/Cue*, with all functions adequately interlocked. A feature of special interest on the KX-710 (and the more expensive KX-910) uses the *Rewind* and *Fast Forward* keys in a new way. In *Play* mode, pushing down the *Rewind/Review* key will rewind the tape, so long as the key is held down. Immediately upon release, the key springs up and the recorder resumes *playing* the tape. Pushing down the *Fast Forward/Cue* key when in *Play* will fast forward the tape until the key is released. The machine then returns to *Play* mode. With this capability, rapid shuttling and searching for beginnings and endings is greatly facilitated. In *Cue* mode a small signal is fed to the output to provide audible clues at the beginning of a recorded program. All in all, a laudable feature.

In front of the VU meters are two indicator lights and five push-button switches. The two indicators, *Normal* and *Chrome*, show the status of the recorder's equalization. The adjacent switch is in *Auto Tape* mode when it's up and *Chrome* tape equalization when it's down. Usually the button would be left up, providing equalization for current low-noise tapes, but automatically switching to correct equalization for chromium dioxide cassettes. There is a little indicator hole in the back of the new chrome cassettes detected by a feeler arm inside the KX-710 cassette compartment, which activates the switch for CrO₂ equalization. If older chrome cassettes without the detection hole are to be recorded, correct equalization is obtained by depressing the button to *Chrome*. For playing older cassettes already recorded, however, *Normal* with the button up is recommended.

Next in line are the *Memory* and the *ALC On-Off* switches. Although Kenwood refers to the latter function as Automatic Level Control, and gives a description of that in the instruction manual, it is really a *limiter* which is actually of more use to the high-fidelity recordist.

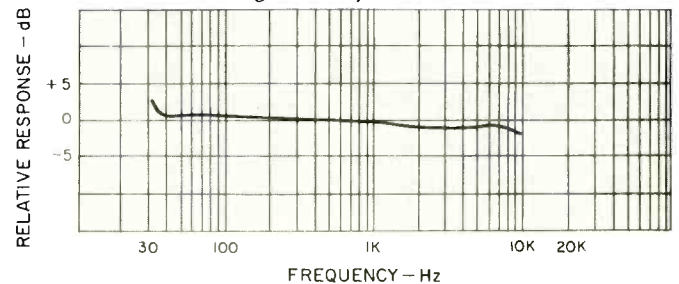


Fig. 3—Playback response using a standard DIN tape.

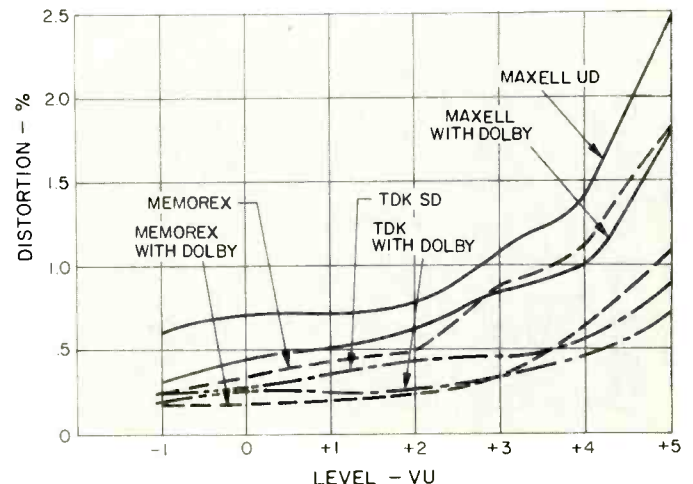


Fig. 4—Harmonic distortion at 1 kHz. Three tapes, each with and without Dolby.

There is, of course, a Dolby On-Off switch. In addition, the Dolby FM/Copy On-Off switch permits listening to Dolby-encoded FM broadcasts in decoded form, while at the same time recording the received signal in its Dolby-encoded form. Slide-type controls are provided for setting record and output levels. On the front side of the deck are two phone jacks for the microphone inputs and a stereo phone jack for headphones. Plugging in the microphones will disconnect the associated line inputs, located on the back of the deck with the line outputs. The On-Off power switch is located on the front-right corner of the main panel. Power-on is indicated by illumination of the VU meters.

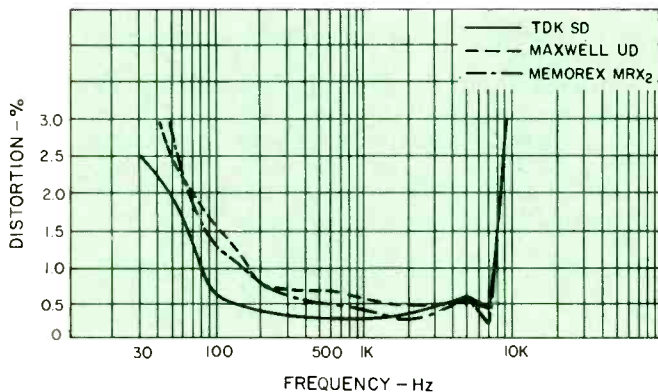


Fig. 5—Distortion across audio spectrum, three tapes.

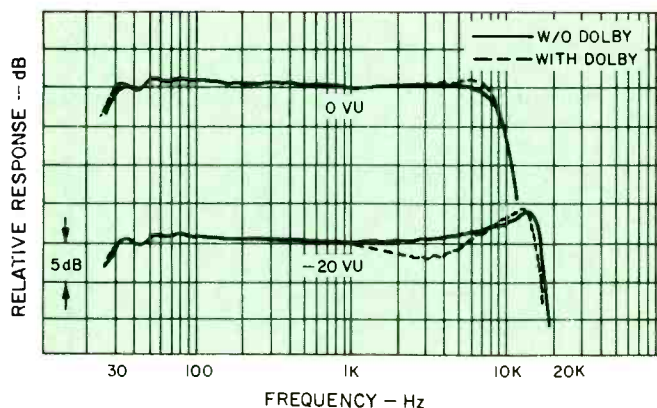


Fig. 6—Record/Playback response, Maxell UD tape, with and without Dolby.

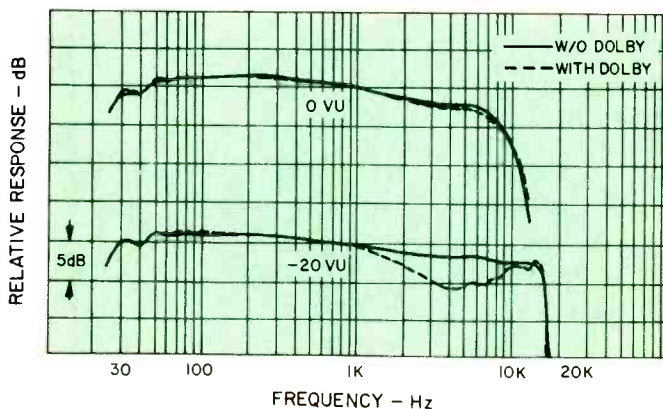


Fig. 7—Record/Playback response, TDK KR (Chromium dioxide) tape, with and without Dolby.

Performance

The Kenwood performed well in all of the tests and met or exceeded most all of its specifications. Playback response using a standard DIN tape is seen in Fig. 3. It shows maximum deviations of +2.8 dB at 31.5 Hz, and -2.0 dB at 10 kHz—all other points were within one dB. The recorder showed good Record/Play response with Capitol Music Tape, being within 3 dB from 26 Hz to 15 kHz at -20 VU and having fairly good headroom at 0 VU—being -3 dB down at 7.5 kHz (both without Dolby). Kenwood specifies 30 Hz to 13 kHz for low-noise tape, with no tolerance given. With the Dolby system in use the high-frequency response was not quite that wide. Memorex MRX₂ had fair headroom at 0 VU, -3 dB at 6.5 kHz. At -20 VU the response extended from 26 Hz to 14.1 kHz.

Record/playback response using TDK KR tape (which activated the auto-switch to *Chrome* equalization) was 3 dB down at 7 kHz for 0 VU, and within ± 3 dB from 26 Hz to 15.7 kHz at -20 VU. Kenwood does not state the deviation for the specified 16 kHz response with CrO₂ tape, but in any event 15.7 kHz is so close to 16 kHz that no one's ears could tell the difference.

The KR-710 showed low distortion at 1 kHz for most low-noise tapes. Figure 4 shows the results with three tapes, Memorex MRX₂, a high density gamma ferric oxide tape, Maxell UD, and TDK's SD tape. Harmonic distortion checks were also made at 0 VU from 30 Hz to 10 kHz with several tapes, shown in Fig. 5. The curves show (typical) minimum distortion between 100 Hz and 9 kHz, with usual increases at the frequency extremes. The average A-weighted signal-to-noise ratio for six low-noise tapes was -47 dBA without Dolby noise reduction, and it was -53 dBA with Dolby, both referred to 0 VU. Using 2 percent distortion as a reference for the maximum level would result in a 4-dB increase in these figures for most of the tapes used in the testing, very good performance for a machine in this price category. With the TDK KR chrome type the signal/noise ratio was 49.7 dBA referred to 0 VU, where the distortion was 2.7 percent. With a 3 percent distortion level reference the ratio was just over 50 dBA, the specification. Using Dolby, the signal/noise ratio was 56.7 dBA using the 3 percent distortion reference, slightly less than the specified 58 dB for chrome tape and Dolby operation.

The erase figures obtained were the same as those for signal-to-noise ratio, demonstrating the ability of the unit to erase a 0 VU signal to below residual record noise. The measured crosstalk of -42 dBA was more than adequate. Our best flutter measurement was 0.04%, and 0.13% the average with DIN weighting or about 0.05% NAB. Average rewind time was 74.5 seconds, just within the 75-second specified. Tape speed was just over 1% fast with 120 V a.c. power.

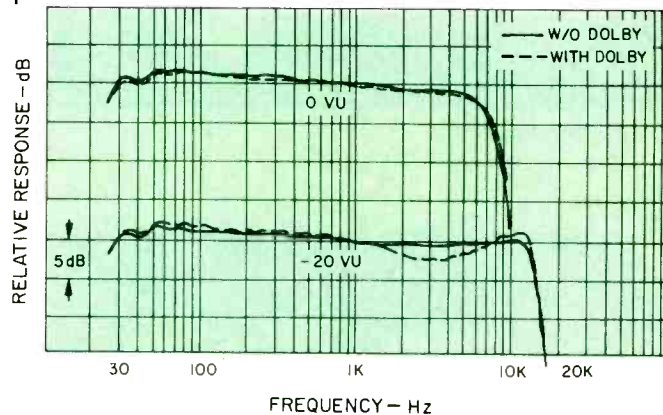


Fig. 8—Record/Playback response, Memorex MRX₂ tape, with and without Dolby.

The drive signal output to the headphone jack was 34 mV across 8 ohms, a bit on the low side, and would require the use of sensitive phones to get good listening volume. *Microphone* input sensitivity of 0.20 mV was somewhat better than the specified 0.24 mV, while *Line* sensitivity was 78.5 mV, very close to the specified 77.5 mV.

The output for 0 VU indication playback was 460 mV, just a little lower than the specified 490 mV, but the level could be increased above this with the output controls. The VU meters were well matched and quite accurate over a range of input levels.

To test the dynamic action of the VU meters, tone burst signals were fed into the *Line* input. The amplitude was such that the meter needles would have deflected to 0 VU had it been a steady signal. Initially the bursts were so short that the needles didn't budge. As the duration of the signals was increased, the needles then began to move slightly, and when the length of the tone burst reached 110 milliseconds the needles showed 0 VU. The *Peak* indicator turned on when each channel was driven at +4.5 VU, with a turn-on time of 1 mS or less.

To prevent the 19 kHz pilot tone of FM stereo signals from adversely affecting Dolby action, a sharp notch filter is used to remove the 19 kHz signal. The Kenwood's response at the Dolby FM copy output jack was plotted. This proved to be flat from 23 Hz to above 20 kHz, excepting an extremely sharp dip of 45 dB at 19 kHz.

In-Use Tests

Personally, I found the combination of the easily-readable well-performing VU meters and the fast-responding peak indicator very easy to work with. The limiter started compressing the input at -12 VU. At a level of +20 VU referred to the normal 0 VU, the actual record level was just +2 VU.

The tape-motion controls required firm pressure for actuation, and were completely reliable throughout the testing. The slide controls used for record and output levels had a smooth, high quality feel which aided in all phases of recording and playback.

The instruction book is sufficiently detailed for most users, and a schematic is supplied with sections and functions clearly identified. General construction of the unit is good with ready access to a considerable portion of the circuitry with simple removal of the bottom cover.

Listening tests were conducted using copies made of tape originals of a trumpet and tympani fanfare and a Bach organ toccata. Memorex MRX₂ provided basically same-sound playback for both of the selections. Maxell UD was judged to be slightly better for the organ work, but seemed very slightly dulled on the trumpets. Overall, the reproduction of both selections was very good for most of the tapes tried. Try the Kenwood KX-710 with some of the new low-noise tapes, and you'll have a winning combination.

Howard Roberson