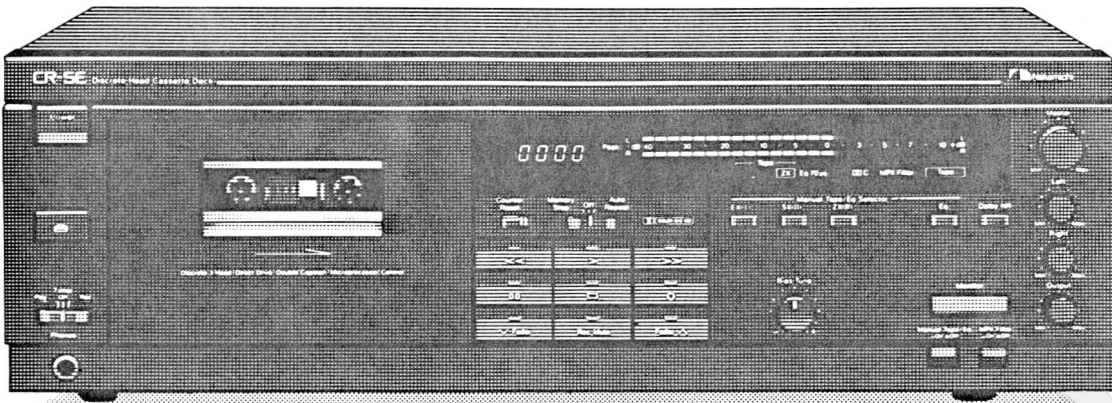


Nakamichi CR-5 Discrete Head Cassette Deck



NAKAMICHI CR-5A CASSETTE DECK

Craig Stark, Hirsch-Houck Laboratories

THE Nakamichi CR-5A cassette deck is aimed at the audiophile who insists on uncompromised engineering but is willing to forgo a few costly special features. It is a three-head, three-motor, dual-capstan unit with Dolby B and Dolby C noise reduction, user-adjustable bias, and memory-rewind and automatic-repeat functions. In all essentials, the CR-5A is identical to the \$1,350 Nakamichi CR-7A we reviewed in the March issue ("Three Top Tape Decks").

Nakamichi is one of the few companies that design and manufacture their own tape heads, and the three-head configuration of its decks permits each head element to be optimized for its function. Most three-head decks use a so-called "sandwich" head construction in which the record and playback elements are contained in a single case. Nakamichi feels that such a design compromises accuracy of alignment and increases bias leakage from the record to the playback head gaps, which can result in Dolby mistracking. The separate record and playback heads of the CR-5A are completely independent units, each with a full set of alignment adjustments. And instead of the Sendust alloys generally used, Nakamichi's heads are made of Crystalloy, a softer but magnetically more linear material. The CR-5A's heads have a rated lifetime of 10,000 hours.

The CR-5A's primary capstan is direct-driven by a DC servomotor. The secondary capstan—which rotates slightly more slowly, creating the tension that holds the tape against the heads—is belt-driven. The use of dual capstans with different rotational dimensions and masses, made of different materials so as to inhibit sympathetic resonance, is said to be responsible for the extremely low wow-and-flutter ratings of the CR-5A. Further, the tensions within the tape path are designed to permit proper tape/head contact without using a cassette's built-in felt pressure pad. In an arrangement unique to Nakamichi decks, the pressure pad is automatically pushed away from the

The Nakamichi CR-5A's signal-to-noise ratios were among the best we have measured on decks using Dolby noise reduction, and its wow-and-flutter figures were extraordinarily low.

playback head by a boss on the head shield. This is said to result in lower scrape flutter and modulation noise. The second DC motor is used for the reel drives, and the third is used with a cam mechanism to operate the head-gate without the jarring produced by solenoids.

Tapes are loaded into a conventional cassette well where sensors

detect the tape type and automatically switch to the appropriate bias and equalization. Unlike most decks, however, the CR-5A provides a manual override that allows the user to switch, for example, to 120-microsecond playback EQ for nominally "high-bias" prerecorded tapes requiring this setting. Bias is adjustable on the front panel, although the user must do the fine-tuning by ear since the CR-5A lacks the sophisticated automatic calibrating system of the CR-7A. We found, however, that patiently adjusting the bias to match the recorded sound of FM interstation hiss as closely as possible with the source was a reasonably good substitute for instrumentation.

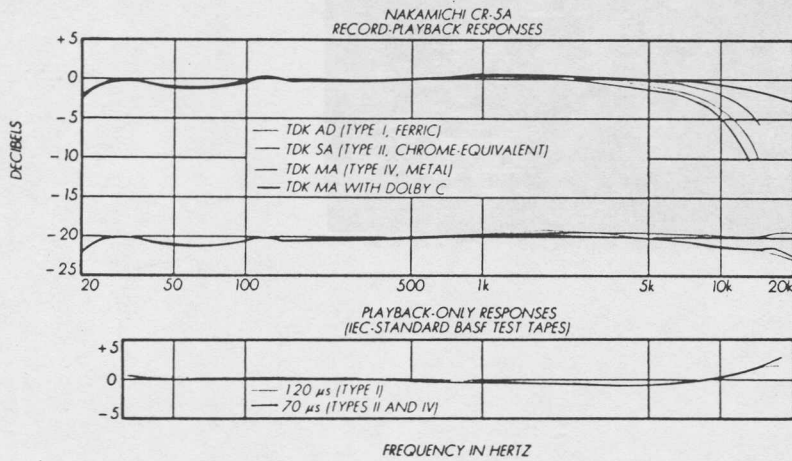
The record-level indicators on the CR-5A are large, easily legible,

We tried everything we could, including pure test tones, to make the CR-5A sound worse than our much more costly reference deck. It was a standoff.

peak-reading fluorescent displays. Their twenty-four segments per channel are calibrated from -40 to +10 dB, with the IEC standard 0-dB level of 250-nanoweber/meter

FEATURES

- Fully separate record and playback heads
- Three-motor, dual-capstan direct-drive transport
- Cam-assisted head-gate mechanism
- Dolby B and Dolby C noise reduction
- User-adjustable bias control
- Twenty-four-segment-per-channel fluorescent level indicators
- Four-digit electronic tape counter
- Playback level control and headphone jack
- Memory-rewind and automatic-repeat functions
- Dual-speed fade-in/fade-out
- Switchable FM-multiplex filter



LABORATORY MEASUREMENTS

Fast-forward time (C-60): 62 seconds

Rewind time (C-60): 62 seconds

Speed error: +0.33%

Dolby B tracking error: +0, -1.5 dB

Dolby C tracking error: +0.5, -1.5 dB

Wow-and-flutter: 0.017% wrms, 0.029% DIN peak-weighted

Line input for indicated 0 dB: 70 mV

Line output at indicated 0 dB: 0.775 volt

Meter indication at IEC-standard 0 dB: +1 dB

Tape: TDK AD (Type I, ferric)

IEC 0-dB distortion: 0.5%

Meter indication at 3% third-harmonic distortion: +5 dB

Signal-to-noise ratios (in decibels):

	Unwtd.	A-wtd.	CCIR
NR off	52.0	57.0	54.7
Dolby B	60.1	66.5	65.1
Dolby C	62.5	71.4	74.1

Tape: TDK SA (Type II, chrome-equivalent)

IEC 0-dB distortion: 0.77%

Meter indication at 3% third-harmonic distortion: +5 dB

Signal-to-noise ratios (in decibels):

	Unwtd.	A-wtd.	CCIR
NR off	54.3	59.1	56.9
Dolby B	60.6	67.8	67.0
Dolby C	63.3	73.1	75.4

Tape: TDK MA (Type IV, metal)

IEC 0-dB distortion: 0.5%

Meter indication at 3% third-harmonic distortion: +7 dB

Signal-to-noise ratios (in decibels):

	Unwtd.	A-wtd.	CCIR
NR off	56.0	60.7	58.3
Dolby B	62.7	69.5	68.5
Dolby C	64.8	74.6	77.3

set at +1 dB. The four-digit tape counter does not indicate elapsed or remaining time. In addition to the Dolby noise-reduction selectors, a switchable FM multiplex filter is provided, together with a switch for an external timer. While there are no microphone inputs, the CR-5A does offer dual-speed fade-in/fade-out buttons and a playback level control.

The Nakamichi CR-5A is a relatively large cassette deck, measuring 17 $\frac{1}{8}$ inches wide, 5 $\frac{1}{4}$ inches high, and 12 inches deep and weighing a little under 19 pounds.

Lab Tests

Measured with our standard IEC calibrated playback tapes, the playback response of the Nakamichi CR-5A was virtually perfect, within ± 1 dB from 31.5 to 12,500 Hz. Above 12,500 Hz the unit showed the slightly rising response (+1.5 to 2.5 dB at 18,000 Hz) typical of no-compromise decks.

For our record-playback measurements we used specially selected, typical-performance sample cassettes of TDK AD (ferric), TDK SA (high-bias), and TDK MA (metal). Even when we did not try to fine-

tune the bias, the deck's frequency response was excellent, varying only +1, -2.5 dB from 20 to 20,000 Hz both at the customary -20-dB test level and at the IEC 0-dB level (where tape saturation invariably occurs at the highest audible frequencies). The relative absence of low-frequency undulations, despite a response that extends an octave below what most deck manufacturers consider sufficient, was also notable.

The signal-to-noise ratios (S/N) were among the best we have measured on decks using Dolby noise reduction. The wow-and-flutter figures were extraordinarily low—better, indeed, than we measured on the Nakamichi CR-7A. High S/N's and low flutter obviously contributed significantly to the sonic clarity evident in our listening tests.

Speed accuracy was excellent, as was the tracking accuracy of the Dolby B and Dolby C circuits. Line sensitivity and output levels were entirely normal.

Comments

There are a few cassettes in our collection of prerecorded tapes where the effect of varying the playback-head azimuth (as the CR-7A allows and the CR-5A does not) makes a clearly audible difference in high-end response. But there are very few such tapes, and we keep them principally for test purposes rather than for listening. For the rest, we could not improve on the playback performance of the CR-5A even by turning to our much more costly reference deck.

Similarly, when it came to record-playback performance, we tried everything we could, including square waves and pure test tones, to make the CR-5A sound worse than the CR-7A or our reference machine. In the end, we concluded that our CR-5A had a slightly greater sonic clarity than our sample of the CR-7A (which had higher wow-and-flutter). When it came to our reference deck, now three years old, it was a standoff. Given that no analog copy can absolutely match a wide-range, low-noise digital original, the CR-5A was clearly state of the art in every way. That makes it a bargain for any serious audiophile.

Circle 113 on reader service card

importeur voor België en Nederland



TransTec bv
Schiedamssevest 71
3012 BE Rotterdam
tel. 010-414 70 55*
telex 27048 tecro nl