Nakamichi CR-3E Discrete Head Cassette Deck

Nakamichi bills the CR-3A as "the least expensive cassette deck that offers the three essentials of Nakamichi recording technology." Those essentials, as the company sees it, are the discrete three-head approach, in which azimuths of the recording and playback gaps are individually adjustable; the asymmetrical dual-capstan drive, in which different capstan diameters and rotation speeds keep mechanical resonances from building up; and electronics designed to achieve recording levels of +10-dB with metal tape.

There are two other aspects of the CR-3A's design that, in our view, are equally characteristic of the company. First, you can choose the recording EQ independently of the tape type. This means, for instance, that you can get exceptional high-frequency headroom with a Type 2 tape by choosing the 120-microsecond EQ normally reserved for Type 1. You can also play (or rerecord) tapes made before the cassette-shell keyways were standardized, which can't be done on most new decks.

Second, there's the comprehensive and exceptionally communicative owner's manual, which can be an overriding consideration if the design of your machine is more advanced than your recording skills. The virtue of the manual is somewhat compromised by its coverage of the more elaborate CR-4, but even its insistence on that model can't obscure the manual's superiority.

At the left of the cassette holder are the power switch, eject button, and headphone jack. Along the bottom of the right-hand portion are the three tape-selector buttons (for Types 1, 2, and 4) and the EQ switch, as well as a knob for fine-tuning bias. Three more buttons turn on the noise reduction, choose between Dolby B and C, and switch the multiplex filter. At the extreme right is an output-level control that adjusts the feed to both the headphone jack and the rest of the system. Frankly, we prefer a level control dedicated to headphone use, but whether or not you agree will depend on how you set up and use your system.

At the upper right are concentric recording-level controls: The outer ring controls balance, while the main knob fades both channels together. The transport's control keys are to the left. Just above them, and below the meter/pilot panel, are a recording-mute button to insert blanks of any length between selections, the source/tape monitor button, the timer (record/play/off) switch, a switch that controls both memory stop (at counter zero) and automatic repeat (in playback, from the head of the tape), and the counter-reset button.

If you want to add a remote control, Nakamichi offers various options. A back-panel jack will accept the RM-5 wired remote. More up-to-date are the matching Nakamichi electronic components, whose unified—and wireless—remotes include cassette-deck controls.

Test Reports

Indicator Readings for 3% Distortion (315 Hz)	
Type 2 tape	+7 dB (for +2.6 dB DIN)
Type 4 tape	> +10 dB (for +8.0 dB DIN)
Type 1 tape	+9 dB (for +5.2 dB DIN)
Distortion (THD at −10 dB DIN; 50 Hz to 5 kHz)	
Type 2 tape	≤0.64%
Type 4 tape	≤0.30%
Type 1 tape	≤0.42%
Erasure (at 100 Hz)	≥73 dB
Channel Separation (at 315 Hz)	43 1/2 dB
Indicator "Ballistics"	
response time	2.4 msec
decay time	≈950 msec
overshoot	0 dB
Speed Accuracy (105 to 127 VAC)	0.4% fast
Flutter (ANSI weighted peak; R/P)	±0.065%
Sensitivity (re DIN 0 dB; 315 Hz)	80 mV
Input Overload (at 1 kHz)	> 10 volts
Input Impedance	49k ohms
Output Impedance	2,200 ohms
Maximum Output (from DIN 0 dB)	0.77 volt

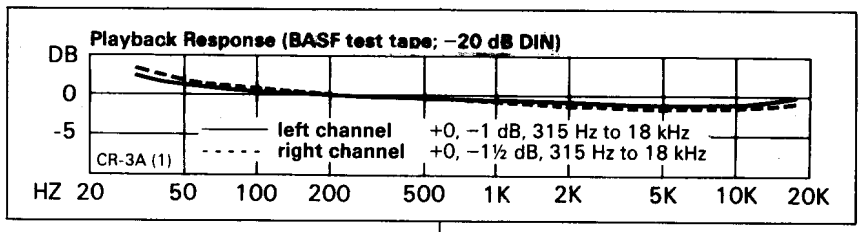
Because calibration points and meter elements don't necessarily align in this and other decks, the value of a given meter segment is, in some cases, a little equivocal. Roughly, calibration runs from −40 to −10 dB in 10-dB increments, from −10 to 0 dB in 5-dB steps, and in 2-dB steps from 0 to +10. The meter's 0 dB is 3 dB below the DIN standard, which is not unusual.

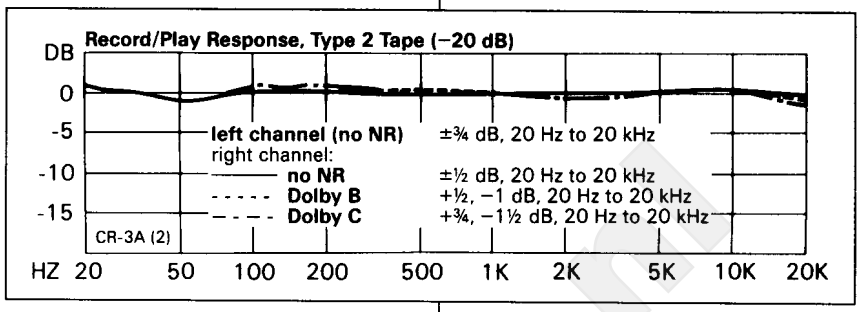
All of Diversified Science Laboratories' tests used Nakamichi's own brand of tape: SX as the chrome-compatible Type 2 ferricobalt, ZX Type 4 metal, and EX-II Type 1 ferric. Because the deck's bias adjustment is subjective (you must compare source and tape by ear while adjusting it), the lab left the bias control at its center detent for the tests. Headroom, as documented by the 0-dB traces (not shown), is superb up to the highest frequencies. Although the CR-3A does not incorporate Dolby HX Pro, its performance with all three tapes rivals (and, in many cases, surpasses) that of the best decks that do. Particularly impressive is the Type 1 response, which shows virtually no evidence of compression until well above 5 kHz and, with Dolby C, rolls off gently only above 10 kHz.

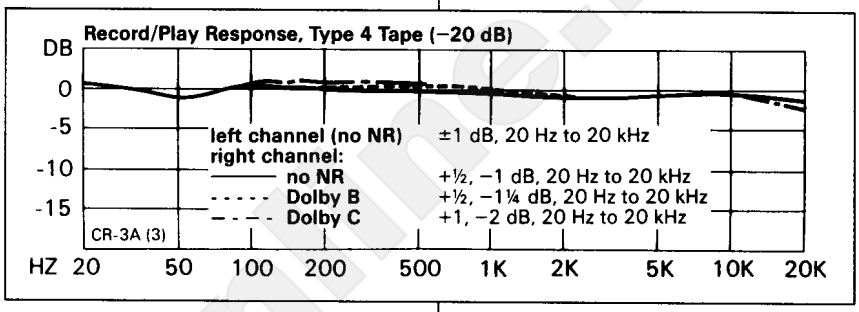
The traces at −20 dB, representing true frequency response, also are superb: wonderfully flat through the treble compared with most decks we have seen. It's tempting to assume that this is because the tape and the deck come from the same manufacturer, but that won't hold water. Nakamichi doesn't actually manufacture the tape sold under its brand name, though the company's product is closely comparable to that produced by the top international brands (as our tape tests have regularly shown). More to the point, perhaps, is Nakamichi's claim to having used "the latest Dolby ICs to provide exceptional dynamic range." It looks as though either these ICs or the discrete-component recording circuitry in the CR-3A is unusually adept at coping with the properties of modern tapes.

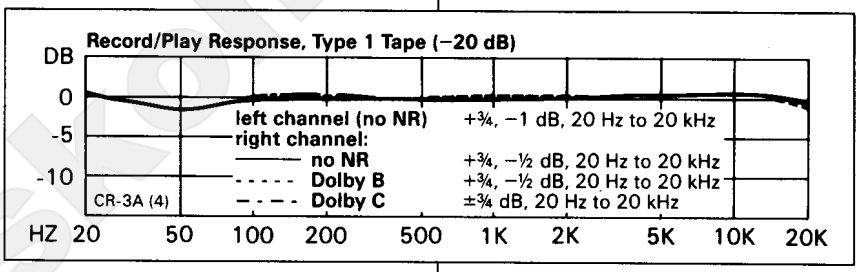
Looking at the level for 3-percent third-harmonic distortion reveals that you really can record at above +10 dB as shown on the meters (equivalent to about +8 dB DIN) onto Type 4 (metal) tape without midrange overload, just as Nakamichi claims. Although the manual recommends a +5-dB maximum for Types 1 and 2, DSL found that you could drive Type 2 tape to +7 dB on the meters before reaching 3-percent distortion. Type 1 tape breezed through with a +9-dB (meter) maximum recording level, which represents excellent headroom. And because the distortion products measured by DSL were entirely odd-order, there's no hint that the recorder might potentially be the limiting factor.

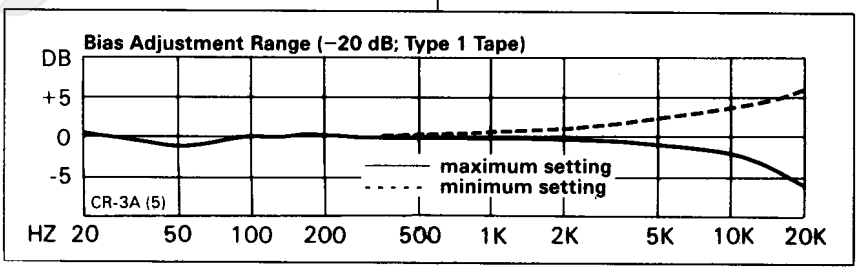
Although it isn't indicated in the graphs, DSL also commented on the stability of the high-frequency output, partly the result of the good azimuth control. But it is no doubt enhanced by Nakamichi's transport, which pushes aside the pressure pad built into the cassette shell and controls the tape's wrap around the head solely by geometry and with the dual-capstan drive. Head geometry also is responsible for the flatness of the bass region, which is unusually free of the "head bumps" caused by contour effects.











In order to keep its price as moderate as it is and still maintain such high audio quality, the CR-3A is free of nearly all frills (such as automatic tape cueing). Some users may desire a more complete means of trimming the tape/deck match: bias *and* sensitivity controls, with some objective method of calibration. While these features are available in the CR-4 (as the manual keeps reminding us), many users will be happier with fewer adjustments to worry about. The CR-3A's response curves show clearly how little such controls are needed as long as you stick reasonably close to Nakamichi's mainstream tape formulations. When you do, you'll find that performance is the essence of the CR-3A. □

Multiplex Filter (defeatable)

flat at 15 kHz; −35 ½ dB at 19 kHz

S/N Ratio (re DIN 0 dB; R/P; A-weighted)

	Type 2 tape	Type 4 tape	Type 1 tape
no NR	58 ½ dB	56 ¼ dB	53 dB
Dolby B	67 ¾ dB	66 dB	63 dB
Dolby C	72 dB	70 ½ dB	68 ½ dB

Indicator Reading for DIN 0 dB (315 Hz)

Type 2 tape	+3 dB (with 1.32% THD)
Type 4 tape	+3 dB (with 0.45% THD)
Type 1 tape	+3 dB (with 0.45% THD)