

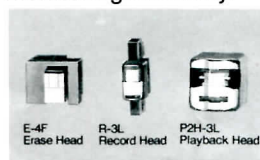
# Discrete-Head Performance

If you believe sound quality is of paramount importance, may we suggest you audition the Nakamichi CR-3 Discrete Head Cassette Deck, the least expensive cassette deck with the three essentials of Nakamichi Technology: Discrete 3-Head Recording, Asymmetrical Dual-Capstan Transport and Nakamichi electronics. Although the CR-3 is designed to be cosmetically and philosophically compatible with Nakamichi Series-3 components, it is at home in the system of every music lover who appreciates the unique clarity and transparency of Nakamichi Sound.

## Discrete 3-Head Technology

Nakamichi invented "3-Head" cassette recording. Our system has often been imitated, but it has never been duplicated! The ability to "monitor" a tape as it is made is an obvious advantage of a 3-head system. But it is not the most important one! The major benefit is the *ability to record and play cassettes with exceptional sound quality*. In this aspect, other 3-head decks fail to meet the mark.

Most 3-head decks use a "sandwich" head which has record and play sections in the same housing. Once the head is made, there is no way to magnetically align the gaps with each other, and without perfect magnetic alignment, response is seriously impaired. Furthermore, with both gaps in one housing, record flux leaks into the play head and affects monitoring accuracy.



The CR-3 uses physically independent ("discrete") record and play heads that are magnetically aligned *after* installation to ensure flat response, maximum headroom and minimum noise. The heads are individually shielded to prevent crossfeed and

noise pickup and are wound with the finest oxygen-free-copper (OFC) wire to minimize loss.

Nakamichi heads are world renowned for their remarkable properties. Our laminated Crystalloy cores have unusually low loss and exceptional flux-handling ability. A special recording gap "focuses" the magnetic energy to penetrate the full tape coating and achieve higher recording levels at lower distortion. Our play gap is exceedingly narrow and easily resolves 20-kHz recordings while a special contour promotes even wear, long life and unusually smooth bass response.

## Asymmetrical Dual-Capstan Transport

Nakamichi's Asymmetrical Dual-Capstan Transport is as different from ordinary 2-capstan drives as our Discrete 3-Head System is from conventional 3-head decks. CR-3 capstans and flywheels differ in diameter and rotate at different rates to maintain tension in the tape as it contacts the heads. This asymmetry prevents common-mode resonance and reduces audible wow and flutter. Furthermore, the CR-3 drive system maintains such *uniform* tension that *the in-cassette pressure pad is not needed to maintain tape-to-head contact*. A unique "lifter" forces the pad out of the way to reduce scrape flutter and modulation noise. These factors do not appear in published specifications but they have an extremely important effect on sound quality. It is fair to say that the low scrape flutter and modulation noise of our Asymmetrical Dual-Capstan Transport is as much responsible for the CR-3's remarkable clarity and transparency of reproduction as any other factor.

The CR-3 transport features Nakamichi's Microprocessor-Supervised Motor-Driven-Cam operating system that automatically tensions the tape as the cassette is loaded to prevent malfunction. The microprocessor provides remote control (via the optional RM-5 Remote Unit), Unattended Recording and Playback, Memory Stop and Auto Repeat while the motorized-cam operating system positions the heads and applies the reel brakes more gently and accurately than conventional solenoid operation.

## Nakamichi Electronics

Nakamichi's electronics' experience is fully evident in the CR-3. Newly developed Dolby circuits and discrete playback preamps provide improved S/N ratio while our high-output record amplifiers achieve levels of +10 dB on metal tape for spectacular dynamic range. Nakamichi's balanced bias oscillator is inherently free of even-order distortion and operates at an unusually high frequency to reduce recorded noise and distortion. A Bias Tune permits you to adjust bias for best performance with a wide variety of tapes while the monitoring feature lets you check how well the bias adjustment has been made.

A special layout and power-supply design enhance channel separation and reduce noise. The grounds for each circuit are routed to a single point to prevent internal loops, and left- and right-channel grounds are separated to prevent interaction. The power supply is based on the Nakamichi Multi-Regulation principle. Audio and logic circuits are fed from separate transformer windings to isolate them from each other, and the transformer is multiply shielded to prevent hum. Local regulators isolate those circuits *affected by noise* (playback preamps, Dolby circuit, bias supply, etc.) from those that *create noise* (meter and motor drive) and from those that draw *variable current* (the headphone amplifier).

## Features

\*Discrete 3-Head System \*Asymmetrical Dual-Capstan Transport \*Bias Fine Tune \*Dolby B/C NR with Defeatable MPX Filter \*Independent Tape & EQ Selection \*13-Segment 50-dB Peak-Level Meters \*One-Touch Rec/Pause \*4-Digit LED Counter with Memory Stop and Auto Repeat \*Timer Rec/Play \*Rec Mute \*Dolby, Source/Tape, Rec Mute, Stop, Play, Pause & Record Indicators \*Concentric Record Level & Balance Controls \*Output Level Control \*Headphone Jack \*Nakamichi Quality Construction with Gold-Plated Input/Output Jacks and Extra-Heavy Chassis \*Remote Control via Optional RM-5 Remote Unit or CA-7 Control Amplifier

## CR-3 Specifications

Track Configuration	4 tracks/2-channel stereo
Heads	3 (erase head x 1, record head x 1, playback head x 1)
Motors	<b>Transport:</b> DC servo motor (capstan drive) x 1 DC motor (reel drive) x 1 <b>Mechanism:</b> DC motor (cam operation) x 1
Tape Speed	1-7/8 ips (4.8 cm/sec) $\pm 0.5\%$
Wow and Flutter	Less than $\pm 0.06\%$ WTD Peak Less than 0.035% WTD RMS
Frequency Response	20 Hz—20,000 Hz $\pm 3$ dB (—20 dB recording level, ZX, SX, EXII tape)
Signal-to-Noise Ratio	<b>Dolby-C NR:</b> Better than 72 dB (A-WTD re 3% THD at 400 Hz, 70 us/ZX tape) <b>Dolby-B NR:</b> Better than 66 dB
Total Harmonic Distortion	Less than 0.9% (ZX tape) Less than 1.0% (SX, EXII tape)
Erasure	Better than 60 dB (100 Hz, +10 dB)
Separation	Better than 37 dB (1 kHz, 0 dB)
Crosstalk	Better than 60 dB (1 kHz, 0 dB)
Bias Frequency	105 kHz
Input	50 mV/30k ohms
Output	<b>Line:</b> 0.5 V/2.2k ohms (400Hz/0 dB/Output Control Max.)
Headphone	5 mW into 8 ohms
Fast-Wind Time (C-60 cassette)	Approx. 80 seconds
Power Source	120, 220, 240 or 110/127/220/240 V AC, 50/60 Hz (according to country of sale)
Power Consumption	35 W max.
Dimensions	430(W) x 100(H) x 265(D) mm 16-15/16(W) x 3-15/16(H) x 10-7/16(D) inches
Approximate Weight	5.8 kg; 12 lb 13 oz

\*Specifications and appearance subject to change for further improvement without notice.  
\*Noise Reduction System manufactured under license from Dolby Laboratories Licensing Corporation.

\*The word "DOLBY" and the Double-D Symbol are trademarks of Dolby Laboratories Licensing Corporation.

## NOTE: "A" and "E" Models

Nakamichi components are sold in more than 50 countries many of which have strict safety regulations to which Nakamichi products must comply. Models designated by an "A" have been produced for the United States and Canada and comply with UL and/or CSA standards as well as with applicable state/provincial and federal safety requirements. Models designated by an "E" have been produced for Europe and comply with EEC Recommendation 82/499 as well as with applicable European safety standards. Models without an "A" or "E" have been produced for countries other than North America, Europe and Japan and comply with applicable safety standards. Nakamichi has authorized its local distributors to warrant only products which have been produced for their respective areas.