



NAD 6300 CASSETTE DECK

by Craig Stark, Hirsch-Houck Laboratories

THE Model 6300 cassette deck from NAD is designed within a tradition of high performance with few frills. A three-head, dual-capstan deck with Dolby B and Dolby C noise reduction, it is unique in incorporating both Dolby HX Pro and DynEQ circuits to extend high-frequency recording potential, and it provides a control to compensate for playback irregularities *before* the signal is processed by the Dolby circuits. All this sophisticated technology is packaged in a distinctly plain wrapper that deliberately eschews such fancy features as programmable music selection, memory rewind, and automatic bias/equalization switching. As if to compensate,

however, the Model 6300 comes with a full-feature wireless remote control.

The record and playback heads of the NAD 6300 are separate units contained in a single case, enabling a user to make an instantaneous comparison between the sound quality before and after recording. This design also permits the use of a wide-gap record head, to maximize signal-to-noise ratio (S/N), and a narrow-gap playback head, to reproduce the highest audible frequencies. Because cassettes recorded on other decks often lack proper high-frequency response, a defect that can be exaggerated when the tapes are decoded by Dolby circuitry, the Model 6300 provides a front-panel

PLAY TRIM control whose boost or cut is restricted to the highest musical octave (10,000 to 20,000 Hz).

The tape transport is solenoid-controlled. The two capstans have slightly different diameters so that the one on the supply-hub side tends to turn more slowly, providing tape-holdback tension, and their flywheels have different masses. This design approach minimizes wow-and-flutter in recordings by preventing the capstans from reinforcing rather than damping out irregularities in the tape motion. A separate motor is used to turn the reel hubs for high-speed tape shuttling.

The cassette well is of conventional design, providing a small amount of rear illumination and moderate label visibility. The front door is easily removable for routine cleaning and demagnetizing.

It has long been known that the amount of record bias that produces

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minimum distortion and maximum S/N at low frequencies also restricts the amount of high-frequency information that can be stored on a cas-

sette. The Dolby HX Pro headroom-extension system, originally developed by Bang and Olufsen, continuously monitors the high-fre-

quency level being fed to the record head, and when it senses that the treble saturation point is being reached, it slightly lowers the record bias to give the tape more high-frequency headroom. At normal signal levels the bias level is unaffected and can be set for maximum low-frequency performance.

The HX Pro circuitry in the NAD 6300 is supplemented by the Dyneq system invented by Tandberg's Herman Lia. Like HX Pro, Dyneq monitors the high-frequency current being fed to the recording head, but instead of lowering the bias, it momentarily reduces the treble boost (record equalization). The problem with treble saturation in cassettes is not that, like a sponge, the tape reaches a point where it can hold no more and ignores attempts to fill it even further. When the treble saturation point on a cassette is reached, further increases in treble input actually lower the high-frequency output from the tape. By lessening the amount of treble boost at high signal levels, therefore, Dyneq maximizes the tape's high-frequency capacity beyond the amount that HX Pro can contribute.

The Dyneq system is less needed with Dolby C than with Dolby B, since the "dynamic skewing" built into Dolby C already lowers the deck's treble boost to some degree. Given the enormous amount of treble boost that must be built into a cassette deck to achieve response out to 20,000 Hz, however, there are potential sonic benefits from the inclusion of both the Dolby HX Pro and Dyneq systems.

The record-level indicators are relatively conventional, with twelve peak-reading LED's per channel calibrated from -20 to +8 dB. The four-digit electronic counter can be switched to register either conventional counter units (reel rotations) or elapsed time, but it contains no memory-rewind or time-remaining circuits.

Three-position lever switches are used to control the Dolby circuits and to set bias and equalization for ferric, CrO₂-type, and metal cassettes. A FINE BIAS control permits a user to compensate for differences in the record-bias requirements of different cassettes, though no built-

FEATURES

- Separate record and playback heads
- Dual-capstan, solenoid-controlled transport
- Dolby HX Pro and Dyneq headroom-extension circuitry
- Playback high-frequency compensation control
- Infrared remote control
- Car stereo processor (dynamic-range compression, bass and treble boost)
- Twelve-segment-per-channel peak-reading LED record-level indicator
- Switchable FM-multiplex filter
- Dolby B and Dolby C noise reduction

LABORATORY MEASUREMENTS

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

Rewind time (C-60): 60 seconds

Speed error: 0.0%

Dolby B tracking error: +0.5, -0.5 dB

Dolby C tracking error: +0.5, -1.5 dB

Wow-and-flutter: 0.018% wrms, 0.029% DIN peak-weighted

Line input for indicated 0 dB: 40 mV

Line output at indicated 0 dB: 0.47 volt

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

Tape: TDK AD (Type I, ferric)

IEC 0-dB distortion: 0.34%

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

Output at 3% third-harmonic distortion: +6.4 dB

Signal-to-noise ratios (in decibels):

	Unwtd.	A-wtd.	CCIR
NR off	59.0	61.5	59.2
Dolby B	62.5	70.2	69.2
Dolby C	65.0	75.7	79.0

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

IEC 0-dB distortion: 0.82%

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

Output at 3% third-harmonic distortion: +4.4 dB

Signal-to-noise ratios (in decibels):

	Unwtd.	A-wtd.	CCIR
NR off	57.3	61.6	59.0
Dolby B	61.8	70.0	69.2
Dolby C	63.5	76.1	78.5

Tape TDK MA (Type IV, metal)

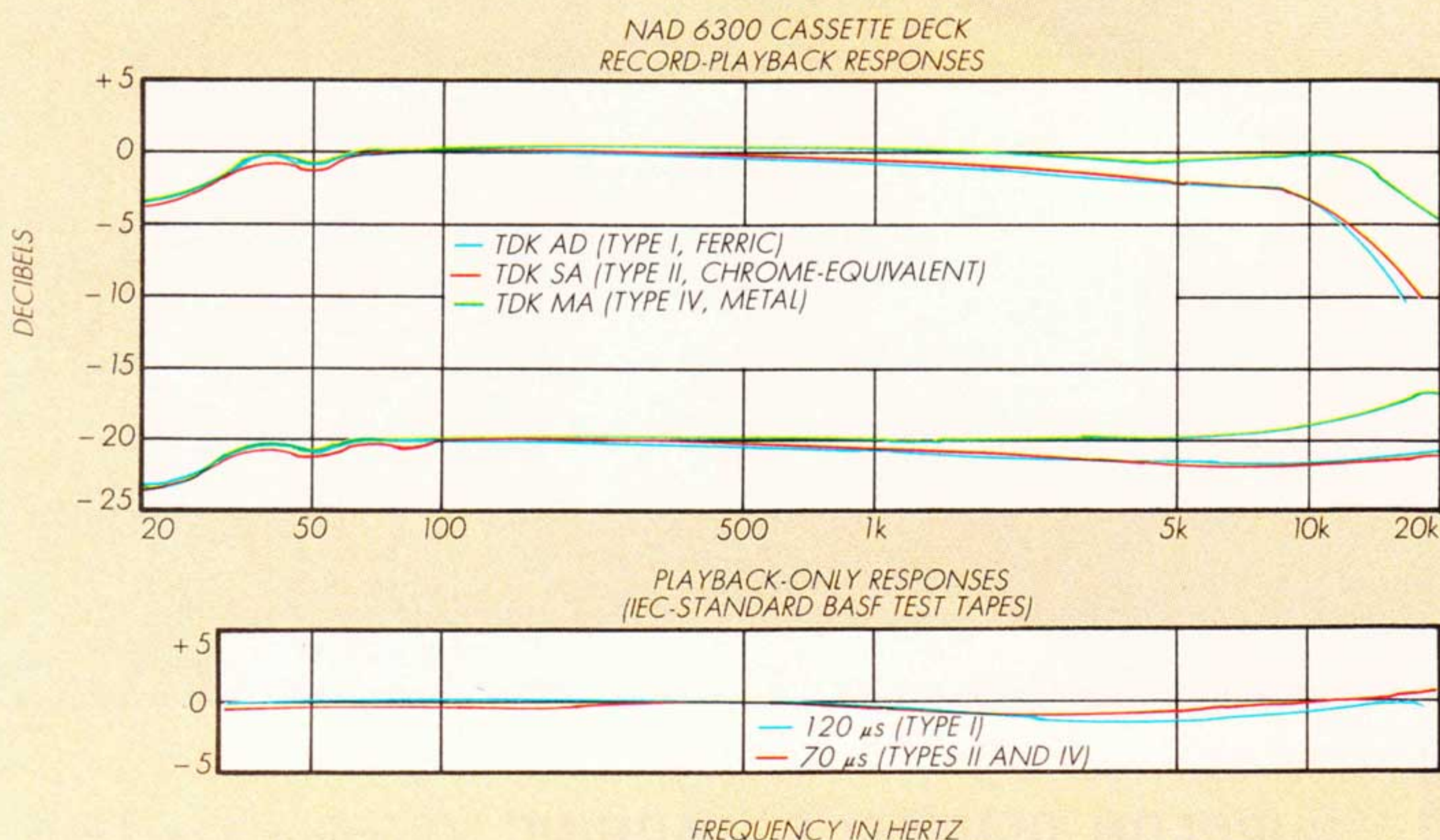
IEC 0-dB distortion: 1.3%

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

Output at 3% third-harmonic distortion: +4.4 dB

Signal-to-noise ratios (in decibels):

	Unwtd.	A-wtd.	CCIR
NR off	56.0	60.6	58.0
Dolby B	61.5	69.4	68.3
Dolby C	63.5	75.0	77.4



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in calibrating equipment is included. A reasonably good adjustment could probably be made by ear, however, by switching between source and tape while recording low-level (-15 - to -20 -dB) interstation hiss on FM.

An additional front-panel push-button switches in circuits that compress the dynamic range and boost the bass and treble of recordings made for automotive playback systems. The FM-multiplex filter is switchable, but the switch is located, perhaps inconveniently, on the deck's rear panel. The large record-level knob surrounds a concentrically mounted balance control.

The NAD Model 6300 measures $17\frac{1}{4}$ inches wide, 10 inches deep, and $4\frac{1}{2}$ inches high, and it weighs a little over 15 pounds. Price: \$798, including remote control. NAD, Dept. SR, 675 Canton St., Norwood, MA 02062.

Lab Tests

The playback frequency response of the NAD 6300, measured with our IEC-standard BASF ferric (120-microsecond) and CrO_2 /metal (70-microsecond) calibrated test tapes,

was exceptionally flat: within ± 1 dB throughout the entire 31.5- to 18,000-Hz range.

Overall record-playback response was measured at the IEC 0-dB level (250 nanowebers per meter) and at -20 dB, using our usual "center-line" samples of TDK AD (ferric), TDK SA (chrome-equivalent), and TDK MA (metal). Samples of Maxell XLI-S and XLII-S supplied with the deck showed somewhat more elevated treble response, but for consistency in comparisons with other cassette-deck test reports we present the TDK-based measurements in the accompanying table and graph (see page 40).

At both signal levels the ferric and CrO_2 -type samples showed virtually identical response. At the usual -20 -dB level the response was within $+0$, -2 dB from about 26 Hz to our 20,000-Hz upper measurement limit. The metal tape showed a slightly rising high-end response ($+3.5$ dB at 19,000 Hz), but it was well within the range of the FINE BIAS adjustment to correct. The contribution of the Dolby HX Pro and the Dyneq circuits was most evident in the high-level high

frequencies, where the metal tape retained perfectly flat response to 12,000 Hz and dropped off only to -4 dB at 20,000 Hz.

The S/N measurements were very good; only a handful of extremely high-priced decks have surpassed the NAD 6300 in this respect, and not by much. What impressed us even more, however, were the wow-and-flutter figures, which are easily among the lowest we have yet measured. We even wondered whether our flutter meter had drifted out of alignment until we rechecked our reference deck, which did show slightly higher figures!

Dolby tracking (at -20 -, -30 -, and -40 -dB levels) was also extremely close, within 1 dB for Dolby B and within 2 dB for the more powerful Dolby C. High-speed winding times were very fast, a minute in either direction for a C-60, and sensitivity and meter calibration were normal. Output at 0 dB was slightly below normal but well within the range of any audiophile-quality preamplifier or receiver.

Comments

In our listening tests, we were very impressed by the clarity and transparent quality of the NAD 6300's high-frequency response, which probably result as much from the deck's exceptionally steady tape handling as from its electronic headroom-extension circuits. Using wide-range CD's as a test source and listening at an elevated level, it was still possible to hear some tape hiss even with Dolby C, but that can be said of the most costly decks.

The remote control's "ergonomic" design made it very comfortable to grip and use—indeed, we found its buttons easier to manipulate than those on the front panel. True, we would have appreciated a headphone jack and a front-panel output control, but these are minor cavils.

In all, we find it hard to do much but praise this newest addition to the NAD line. Others might seek a more feature-filled and stylish-looking deck, but for us, the wide-range, unsullied sound quality was an excellent match for the unadorned exterior. We suspect many other audiophiles will agree.

Circle 141 on reader service card

