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## ONKYO INTEGRA TA-207 CASSETTE DECK

The Integra TA-207 is, in a sense, a summation of Onkyo's approach to cassette deck design. Its Accubias system to fine-tune recording to the particular tape at hand has been an important feature of the company's decks for years. The "three-head" de-

### Manufacturer's Specifications Frequency Response ( $\pm 3$ dB):

Type I tape, 30 Hz to 17 kHz; Type II, 30 Hz to 18 kHz; Type IV, 30 Hz to 19 kHz.

**S/N:** 60 dB with metal tape, noise reduction off.

**Input Sensitivity:** 80 mV.

**Input Impedance:** 50 kilohms.

**Output Level:** 500 mV for 0-dB recorded level.

**Power Consumption:** 25 watts.

**Dimensions:** approx. 17<sup>15</sup>/<sub>16</sub> in. W x 5<sup>3</sup>/<sub>16</sub> in. H x 14<sup>7</sup>/<sub>16</sub> in. D (45.5 cm x 13.1 cm x 36.8 cm) including projecting controls and back-panel jacks.

**Weight:** 15 lbs. (6.8 kg).

sign permits off-the-tape monitoring during recording and, as a by-product, relatively easy adjustment of the Accubias. The dual-capstan drive system uses three motors and has an anti-resonance pad to damp shell vibration and minimize mechanical disturbances.

**Price:** \$529.95.

**Company Address:** 200 Williams Dr., Ramsey, N.J. 07446.  
For literature, circle No. 91



# The Onkyo TA-207 deck includes the most popular conveniences as well as technical features for relatively serious use.

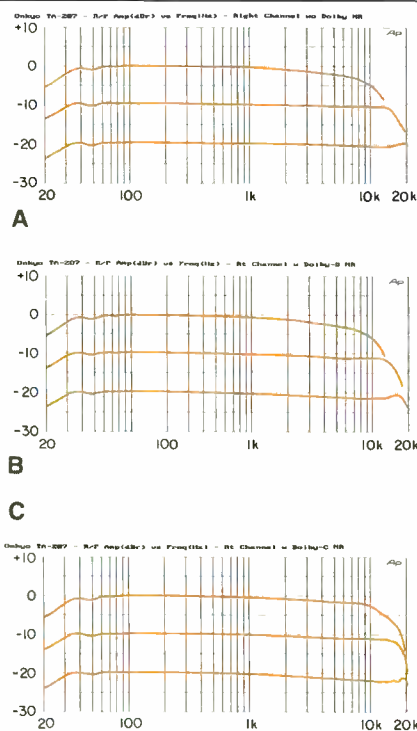
At the same time, the design incorporates a cross section of the most popular convenience features consistent with the relatively serious use implied by the basics mentioned above. In addition to the familiar timer functions, auto-space (to insert five-second silences ahead of the selections you record), and AMCS (Onkyo's label for a function that samples about 10 seconds from the beginning of each selection on a tape), there are repeat and time-display functions comparable to those commonly found in Compact Disc players. The real-time counter can be set to show elapsed or remaining time. The repeat can be set to play any portion of the tape that you choose, and it stops automatically after the fifth playing.

The TA-207 is supplied with a wireless remote and can be used (via back-panel connections) with Onkyo's other Remote Interactive (RI) control-system components. The recorder incorporates both Dolby B and C noise-reduction options, Dolby HX headroom extension, and defeatable FM-multiplex filtering.

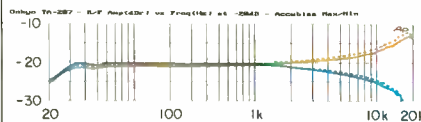
## Control Layout

The transport, counter-mode, "Repeat," and monitoring controls all are grouped below the central display panel. The transport controls are larger than the others, with the "Play" button the largest of all. At the extreme left, beyond the transport door, are the main power switch, headphone jack, "Eject" button and remote-control sensor. Just to the right of the display are switches for "Display" brightness ("On/Off," "Dim/Normal"), noise reduction, and multiplex filter. The recording-level control is a single knob at the extreme right; channel "Balance" is controlled separately by a smaller knob below it. The two remaining knobs are for the "Timer" modes and "Accubias."

The "Tape Size" indicator in the counter group sets the time counter to match the tape currently in use. It has options for C-46, C-60, C-90, and C-120 cassettes. In-between lengths presumably use the nearest available option, but the interesting element is the inclusion of C-120, whose very existence is all but denied by many a deck-maker.



**Fig. 1—Record/play frequency response with Type II tape, at levels of 0, -10, and -20 dB on the meter, with noise reduction off (A), with Dolby B NR (B), and with Dolby C NR (C). Only the left (worse) channel is shown; right-channel performance was very slightly better.**



**Fig. 2—Record/play response with Type II tape, no NR, at maximum and minimum Accubias setting. Left channel is solid curve, right channel is dashed.**

Equalization is set automatically by sensors that detect the keyways in the shell of the cassette in use. The same sensors control basic bias adjustment for recording. The "Accubias" can then be used to "tweak" bias above or below the median value at the control's center detent; the manual lists suggested settings for specific tapes. When in doubt, says the owner's manual, leave the "Accubias" set at the detent. It was therefore set that way for all record/play measurements except the curves documenting the adjustment range).

The meter portion of the display is calibrated at 1-dB increments between -3 and +3, at 2-dB increments from there to -7 and +7, at +10 (the top of the scale), and at -10, -20, and -30 dB. The styling of the scale suggests that finer divisions can be read, but the elements light in blocks centered on each calibrated point.

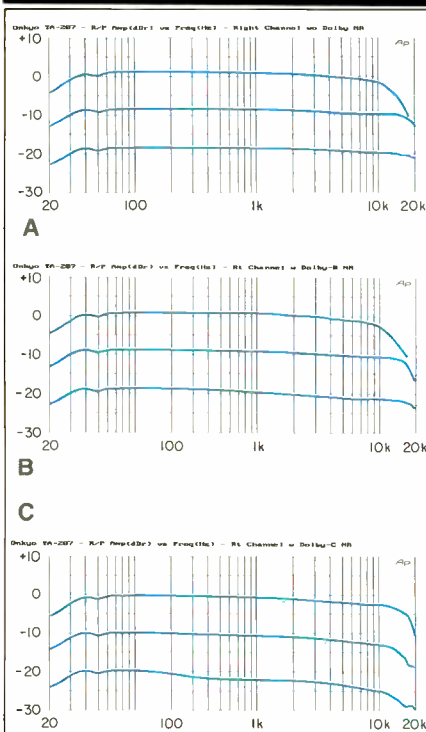
The supplied remote is designed for use with other Onkyo models as well. It includes a "Monitor" switch, buttons to control the counter-display functions ("Tape Size," elapsed/remaining time, and "Reset"), AMCS and auto-space buttons, and the basic transport controls, including recording. They don't work exactly like the front-panel controls—the remote combines recording and pause in a single button and includes a non-functioning reverse-direction play button—but these disparities should not become a source of confusion when using the TA-207.

## Measurements

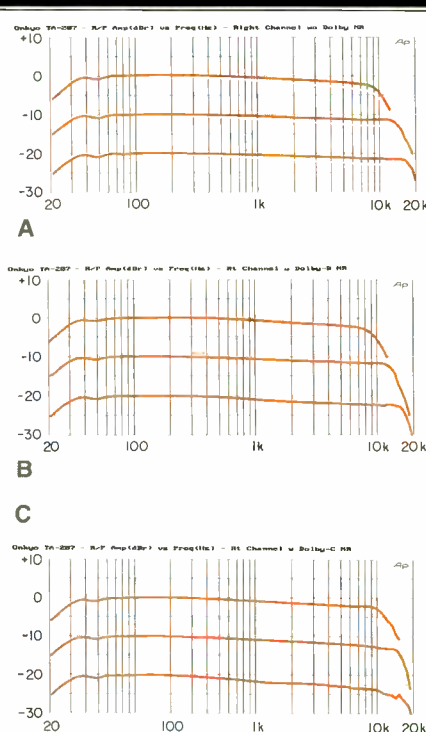
The measurements, by Diversified Science Laboratories, take the DIN/IEC/EIA standard of 250 nanowebers per meter of recorded flux as the 0-dB reference. Past *Audio* reports by the late Howard Roberson used 200 nWb/m, which is Dolby reference level, as the benchmark. Keep this in mind if you compare our findings with earlier reports. The present reference level is about 2 dB higher, which makes signal-to-noise ratios look a little better and overload figures look a little less generous.

For the record, all the tapes used for record/play measurements were Maxell formulations specifically suggested by Onkyo. Except as noted, the measurements were made with Type II

Response with Type II tape is exceptionally flat and very extended at  $-20$  dB, with only moderate treble compression at  $0$  dB.



**Fig. 3—Record/play frequency response with Type IV tape, at levels of  $0$ ,  $-10$ , and  $-20$  dB on the meter, with noise reduction off (A), with Dolby B NR (B), and with Dolby C NR (C). Left channel shown.**



**Fig. 4—Record/play frequency response with Type I tape, at levels of  $0$ ,  $-10$ , and  $-20$  dB on the meter, with noise reduction off (A), with Dolby B NR (B), and with Dolby C NR (C). Left channel shown.**

tape (Maxell XLII), which seems to be by far the tape type of choice for most purposes by many serious recording enthusiasts these days. As Fig. 1 demonstrates, response is fundamentally excellent with this tape. Without noise reduction (Fig. 1A), the  $-20$  dB curve is exceptionally flat and very extended. There is only a tiny peak at the top end of the curve and almost no "head bumps," attributable to contour effect, at the bottom end. Even at  $-10$  dB the curve is textbook-flat to well above  $10$  kHz, which presumably is a tribute to the Dolby HX Pro. There is only moderate high-frequency compression at  $0$  dB.

Adding noise reduction (Figs. 1B and 1C) introduces a slight treble sag, suggesting that the test tape may offer a little less output than the internal sen-

sitivity adjustment of the playback Dolby circuit is set for, but the effect is slight. Response still can be characterized as excellent.

Figure 2 suggests that tweaking the Accubias might have flattened the mid-treble a bit, though not without exaggerating the little peak near the top end of the response curves shown in Fig. 1, which were all measured with the Accubias at its detent. The improvement would be so slight, and so little needed, that I'd second Onkyo's advice to keep the control at the detent unless there's a real reason for doing otherwise.

The Type IV tape (Maxell MX) appears to be a bit overbiased (Fig. 3), judging from the slight, gradual roll-off toward the top end of the  $-20$  dB response curves. Adding noise reduc-

tion increases the roll-off; the response curves' shapes further suggest a sensitivity mismatch—that is, the deck's internal Dolby level adjustment was based on a tape of higher output than MX. In other respects, the Type IV response curves remain excellent.

There is no Type IV Accubias graph, incidentally, because Onkyo says that Accubias is ineffective on Type IV tapes. (I was unable to detect any significant change in response, in fact, when I exercised Accubias with MX during the listening tests.)

Type I response (Fig. 4, measured with UDI) follows the pattern of Type IV except that it doesn't have quite the bandwidth at the top of the spectrum, where it also lacks the metal formulation's excellent headroom. On the other hand, it doesn't pay as much of a roll-off penalty with Dolby C, possibly because of better sensitivity tracking. And Fig. 5 suggests that Accubias could be employed to good effect in bringing up the Type I treble.

Figure 6 shows that distortion at a recorded level of  $-10$  dB remains below  $1\%$  from below  $40$  Hz to above  $3$  kHz with the Type II tape, which is the best performer of the three except in the extreme bass. Over the working frequency range, there's little to choose between the three tape types; all come in at no worse than about  $1.3\%$  between  $50$  Hz and  $5$  kHz (our usual assessment range), but the differences in the shapes of the curves are interesting.

Distortion at higher levels is examined in Fig. 7. Again, the differences between formulations aren't huge, but the way the Type I tape resists going into overload as signal level increases is instructive. It is one reason for choosing Type I and Dolby C (to compensate for Type I's noise penalty at its  $120\text{-}\mu\text{S}$  EQ) over Type II or IV and Dolby B, if you're faced with that choice. With many a tape brand, the best Type I formulation has the lowest distortion.

Figure 8 shows minor high-frequency roll-off in playback when measured with the BASF test tape. These curves are fairly typical of cassette equipment these days. In addition, the lab ran tests for interchannel phase angle, which suggested that the roll-off is due primarily to a slight azimuth disparity

The TA-207's ergonomics are very well thought out, including its recording level controls and the indicator LEDs in the buttons.

between the deck and the test tape, although documentation supplied with the test sample suggests that the BASF tape is used in checkout by Onkyo as well. The superiority of the Type II record/play curves over the corresponding playback curves seconds this assessment, because the electrically independent record and play heads share a common shell, which keeps the recording and playback gaps mutually aligned even when overall azimuth is misaligned.

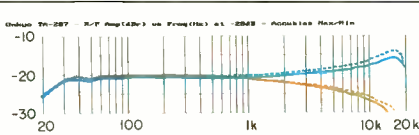
Table I supplies basic information that should raise no eyebrows. Things get a little more complex in Table II. Its primary message is that if you habitually record so that the peaks just hit your meters' 0-dB indication, you'll be wasting 3 to 5 dB of headroom with the TA-207—or, conversely, that you will have 3 to 5 dB of "pad" to prevent overload on those peaks you didn't bother checking out. Since +5 dB is above the meter's range of greatest (1-dB) resolution, Onkyo evidently expects you to do your fussing lower down and leave the actual overload point as protection.

The noise figures (also in Table II) are very good: Typical of top deck models and blank tapes these days. The disparities between the two sets of noise measurements reflect the differences between the weighting schemes. Though A-weighting is fairly standard, the CCIR curve may offer a better simulation of human aural acuity.

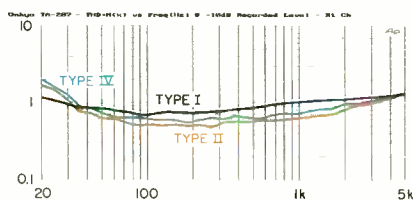
The meter-response figures in Table III indicate that the cursor will respond to the current maximum within about 5 mS and that the most recent maximum

**Table I—Input and Output Characteristics (re: 250 nWb/m recorded level at 315 Hz).**

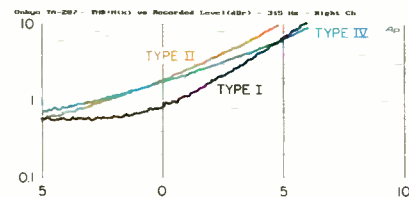
Line Input Sensitivity	86 mV
Line Input Impedance	60 kilohms
Line Input Clipping Level	more than 10 V
Line Output Level	585 mV
Line Output Impedance	825 ohms
Headphone Output Level	710 mV
Headphone Output Impedance	90 ohms



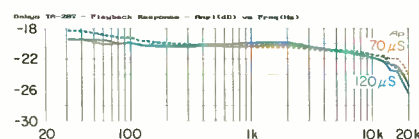
**Fig. 5—Record/play response with Type I tape, no NR, at maximum and minimum Accubias setting. Left channel is solid curve, right channel is dashed.**



**Fig. 6—THD + N vs. frequency at -10 dB recorded level, no NR.**



**Fig. 7—THD + N vs. level at 315 Hz, no NR.**



**Fig. 8—Playback response for BASF 120- and 70- $\mu$ S calibration tapes; 0 dB equals 250 nWb/m at 315 Hz.**

will stay illuminated for some 700 mS. As with many meters, only the top element (or block) of the meter remains illuminated if the signal then drops more than one element to the left on the meter. Like virtually all non-mechanical meters, it exhibits no overshoot on transients.

The interchannel phase-error figures near the end of the table are very good (and confirm again that playback azimuth does not affect record/play behavior). The vibration-damping pad behind the cassette shell should help keep jitter low. The multiplex filter is not exceptionally vigorous, though a response plot shows that it actually takes about 10 dB more out of the signal at frequencies slightly higher than the crucial 19 kHz of the measurements. Other data in this Table document admirable (if not necessarily exceptional) behavior.

#### Use and Listening Tests

Most of the practical tests centered around Type II tapes. I was able to make very good recordings with them. Predictably, from the lab data, I was a little less satisfied with the results using Type IV or I tapes. Playback fidelity is harder to judge, because any minor loss of sparkle is as easily blamed on the equipment used in making the recording (be it commercial or home-grown) as on the deck under test. The TA-207 is, at minimum, well within the acceptable range in this respect.

The Accubias makes a significant difference with Type II tapes, of which I used several in addition to the Maxell. The owner's manual offers a diagram of suggested settings for a long list of Type II and Type I tapes, many of which are available on the U.S. market. It does not take up the question of vintage, however, and some tapes demonstrably will produce best results at different settings if you are working with samples from different years of manufacture.

The suggested method of setting Accubias is to detune your FM tuner (disconnecting its antenna helps) and defeat its muting. Recording interstation noise at -10 dB, you can monitor from the tape to hear the effect produced by rotating the Accubias knob. Using the monitor switch, you can then compare the taped sound to the

Like all Onkyo equipment, the TA-207 is solidly built and generously supplied with features for its price.

**Table II—Indicator Characteristics. Tape Overload, and Dynamic Range.**

	Type II	Type IV	Type I
Meter Reading (source) for DIN 0 dB Recorded Level	+2 dB	+3 dB	+1 dB
THD + N at DIN 0 dB	2.1%	1.9%	0.91%
Meter Reading (source) for 3% THD + N	+3 dB	+5 dB	+5 dB
Recorded Level at 3% THD + N	+1.3 dB	+2.2 dB	+3.3 dB
A-Weighted Noise (Record/Play, re: DIN 0 dB)			
No noise reduction	-61.1 dB	-59.0 dB	-56.5 dB
With Dolby B	-69.8 dB	-67.7 dB	-65.8 dB
With Dolby C	-78.7 dB	-77.4 dB	-75.5 dB
CCIR/ARM-Weighted Noise (Record/Play, re: DIN 0 dB)			
No noise reduction	-59.1 dB	-56.7 dB	-53.9 dB
With Dolby B	-69.3 dB	-67.2 dB	-64.3 dB
With Dolby C	-79.7 dB	-78.2 dB	-75.4 dB

source and adjust Accubias for closest possible replication of the latter's high-frequency balance. This is a little tricky because (depending on tape sensitivity) the output isn't always precisely matched to the source's level, but it works.

In general, the settings that seemed best to me were somewhat lower than those recommended for the same brands in the owner's manual, but that may be because some of my samples are not of very recent provenance. Of the three vintages of TDK SA that I tried, two sounded best with the knobs at about the 10 o'clock position, and one at about 9 o'clock; the manual places SA at 12 o'clock, the detent.

Ergonomically, the design is generally very well thought out. I particularly appreciated the individual recording knobs for level and balance; clutched concentric elements for the two channels seldom are satisfactory. Also of note: The tiny in-use LEDs in the "Record," "Pause," and "Play" buttons, so you don't have to search for mode indicators buried in the display.

On the down side, there is no level control for the earphone output. While Onkyo's earphone drive level is well chosen, you may not consider it ideal, depending on both your taste and the sensitivity of your headset. Also, the earphone jack is just above the main power switch, which I tended to trip when I withdrew the phone plug. Unless you use the TA-207 for live recording—a use to which no current home

**Table III—Other Characteristics.**

Meter Response	
Time	approx. 5 mS
Meter Peak-Hold	
Duration	approx. 700 ms
Playback Speed	
Accuracy (105 to 127 V a.c.)	0.1% slow
Record/Play Wow & Flutter (IEC)	±0.085%
Fast-Wind Times (C-90 cassette)	approx. 90 S
Record/Play Channel Separation (315 Hz)	51.9 dB
Erase (Type IV Tape, at 100 Hz)	66.8 dB
Record/Play Interchannel Phase Error (at 10 kHz)	
Average	+1.4°
Jitter	±4.4°
Multiplex Filter (at 19 kHz)	-31.0 dB

deck I'm familiar with is well adapted—these caveats will be of little importance, however.

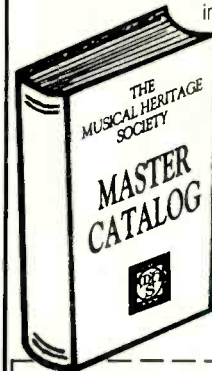
The concept of the TA-207 will be familiar to anyone who has been keeping an eye on Onkyo's progress in the cassette-deck field. Its design presents no surprises—which is to say that it's an evolutionary, rather than revolutionary product. Like all Onkyo equipment, it is solidly built and generously supplied with features for its price group.

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