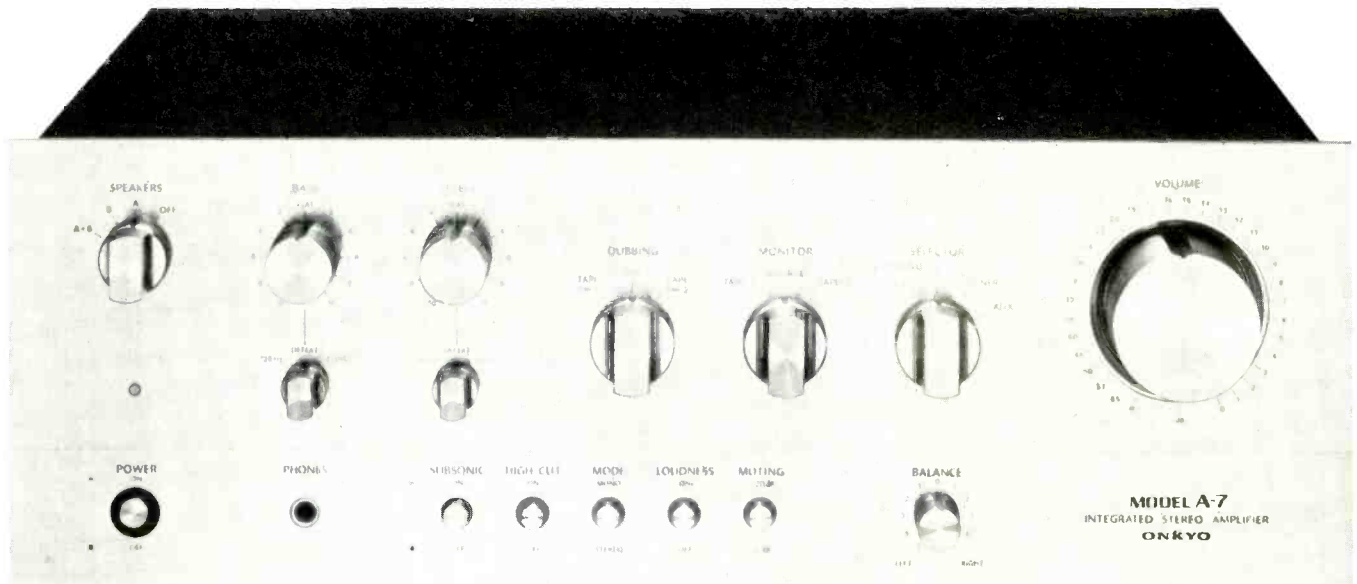


# Equipment profiles



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## Onkyo Model A-7 Integrated Amplifier

### MANUFACTURER'S SPECIFICATIONS

#### Power Amplifier Section

**Power Output:** 65 watts continuous power, 8 ohm loads, from 20 Hz to 20 kHz, at no more than 0.1 per cent total harmonic distortion. (70 watts, 4 ohms.)

**IM Distortion:** 0.1 per cent.

**Frequency Response:** 2 to 80,000 Hz  $\pm 1$  dB.

**Rated Input:** 1.5 V.

**Damping Factor:** 50 (8 ohms).

**S/N Ratio:** 110 dB (IHF "A" Weighting).

**Input Impedance:** 100 kilohms.

#### Preamplifier Section

**Input Sensitivity:** Phono, 2.5 mV; High Level, 150 mV.

**THD:** 0.05 per cent.

**IM Distortion:** 0.08 per cent.

**Frequency Response:** Phono, RIAA  $\pm 0.2$  dB; High Level, 10 Hz to 50 kHz,  $+0, -1$  dB.

**Phono Overload:** 230 mV at 1 kHz.

**S/N:** Phono, 80 dB (IHF "A" Weighting); High Level, 90 dB (IHF "A" Weighting).

**Maximum Tone Control Range:** Bass,  $\pm 10$  dB @ 100 Hz; Treble,  $\pm 10$  dB @ 10 kHz.

**Tone Control Turnovers:** 125 Hz, 400 Hz, 2 kHz, and 8 kHz.

**Low Filter:** 10 Hz cut-off, 6 dB/octave.

**High Filter:** 5 kHz cut-off, 6 dB/octave.

**Muting:**  $-20$  dB.

#### General Specifications

**Power Requirements:** 120 V, 60 Hz a.c.

**Dimensions:** 17½ in. (44.5 cm) W X 6¼ in. (15.9 cm) H x 15 in. (38.1 cm) D.

**Weight:** 29.7 lbs. (13.5 kg).

**Price:** \$349.95.

To the audiophile who has progressed beyond the "receiver approach" to high-fidelity components, a good integrated amplifier offers the next logical step if budget needs and inclination are not geared to a system of total separates. Many manufacturers, recognizing this renewed interest in integrated amplifiers, have been concentrating their efforts on mid-priced, mid-powered preamp-amps which offer precise and comprehensive control and switching flexibility, attractive styling, and fairly compact packaging. Typical of such integrated amplifier designs is Onkyo's Model A-7, the higher-powered of two similarly configured integrated amplifiers in their present line.

The front panel of the A-7 features a massive volume control knob at the upper right, calibrated in 1 dB detented

steps down to  $-18$  dB, then in 2 dB steps down to  $-28$  dB, and in larger attenuating increments from that point downward. Three easy-to-grip selector switches handle program source selection (two phono inputs, AUX and tuner), tape monitoring of up to two decks, and tape dubbing from either deck to the other. Separating the dubbing and monitoring switches in this manner makes it possible to dub from tape to tape, while listening to any other program source such as phono or tuner. Click-stop bass and treble controls (affecting both stereo channels at once) are associated with three position turnover switches located just below them which select 125 Hz or 400 Hz bass turnover or 2 kHz and 8 kHz treble turnover points. In their mid-positions, these switches by-pass tone control action completely. A

speaker selector switch is located at the upper left of the panel, above a power-on indicator light and the power *On/Off* pushbutton switch.

Other controls and switches along the bottom edge of the front panel include the usual phone jack, a series of five pushbuttons which activate a sub-sonic filter, high-cut filter, mono/stereo selection, loudness circuitry, -20 dB audio muting, and a small rotary balance control knob.

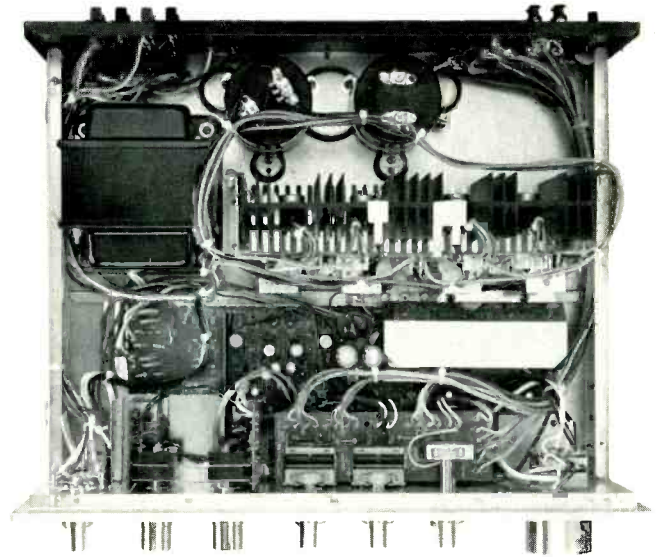
The rear panel of the Onkyo A-7 contains the appropriate input jacks, tape-out jacks, preamp-out/main amp-in jacks (interconnected by means of wire jumpers for normal use), and a chassis ground terminal at the left. At the far right are two sets of color-coded speaker terminals which feature vertically oriented molded channels or routing paths that make it nearly impossible to create short circuits between adjacent speaker wire ends. Easily replaceable 5 ampere fuses are also located in this area (these are in series with the output signals), along with a linefuseholder and three a.c. receptacles (one switched, the other two unswitched). Output stage heat sinks are located inside the chassis itself, and three rows of ventilating slots are located at the center of the rear panel to permit adequate air flow through the unit.

### Internal Construction and Circuitry

The A-7's large power transformer and associated 25,000 mF filter capacitors are clearly visible in the photo of the internal layout of this amplifier. Onkyo claims that this oversized power supply system, though common to both channels, together with their use of a buss feeder ground, brings the equivalent series resistance of the power supply as close to "zero" as possible.

The phono preamplifier-equalizer section of the A-7 uses class-A, differential-amplifier, push-pull circuitry, and a total of six transistors is required for each stereo channel of this phono preamp. The power amplifier section utilizes a class-A, push-pull driver stage and differential, direct-coupled, pure complementary-symmetry output circuitry. Two major printed circuit modules are used in the A-7. One is for the preamp/control circuitry, the other is for both channels of the power amplifier section and is mounted vertically and integral with the massive heat sinks. A circuit refinement worth mentioning has to do with the tape switches. When the monitor switch is in the *Off* switch, connection to the *Rec Out* jacks is interrupted to prevent possible loading of circuits by associated tape deck input impedances.

A relay-type protection circuit is incorporated in the A-7 in addition to the output line fuses mentioned earlier. If abnormal d.c. voltage should appear at the speaker terminals because of power amplifier malfunction or some other



reason, the relay contacts will open to protect against speaker damage.

### Power Amplifier Section Measurements

Figure 1 is a plot of harmonic and IM distortion versus power output, using 8-ohm loads. Under this load condition, using a 1-kHz test signal, the amplifier delivered a continuous power output of 71 watts per channel for rated (0.1 per cent) THD and 76 watts per channel for rated IM distortion (0.1 per cent). At rated power output, THD measured 0.006 per cent for a 1-kHz test signal, while IM distortion was 0.019 per cent. Since Onkyo offers a power rating for 4-ohm operation, measurements were repeated for this lower load impedance, and results are plotted, for a 1 kHz test signal, in Fig. 2. During these tests, the amplifier delivered 93 watts per channel for rated THD and IM.

Figure 3 is a plot of distortion versus frequency, taken at rated output (65 watts per channel, both channels driven) once again using 8-ohm loads. On the basis of the results obtained, it is clear that Onkyo has rated this amplifier very conservatively and might well have specified the power band as extending from below 10 Hz to 30 kHz.

Frequency response, measured via the main amp inputs, extended from below 10 Hz to 65 kHz for the -1 dB roll-off points and up to 110 kHz for a -3 dB roll-off. Damping factor measured exactly 50, as specified. Unweighted signal-

Fig. 1—Harmonic and intermodulation distortion characteristics of the Onkyo A-7 amplifier with 8-ohm loads.

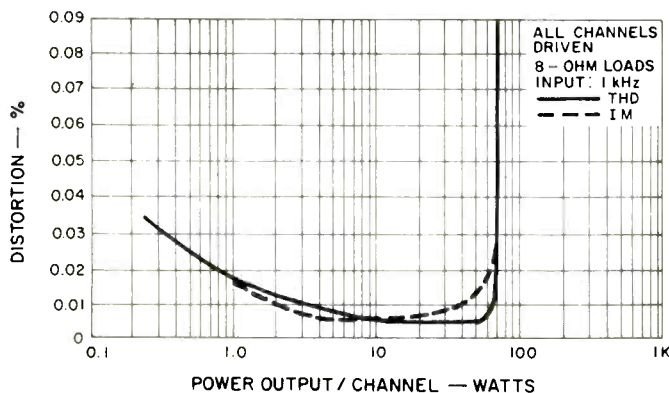
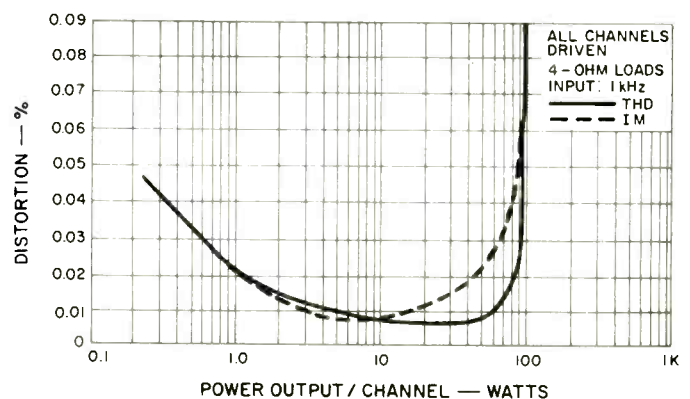


Fig. 2—Harmonic and intermodulation distortion characteristics with 4-ohm loads.





to-noise ratio for the main power amplifier section measured 104.5 dB relative to full rated output.

### Pre-amplifier Section Measurements

Phono input sensitivity (for both *Phono 1* and *Phono 2* inputs) measured 2.6 mV for rated output. Phono overload was an impressive 245 millivolts (as opposed to 230 mV claimed), and phono S/N was outstanding, with readings of 81 dB (IHF "A" weighted), referred to actual input sensitivity.

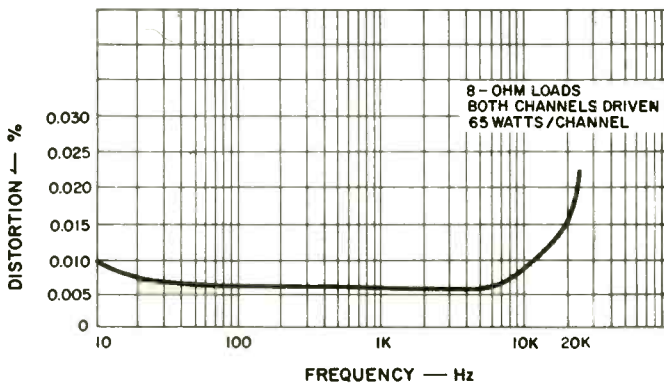
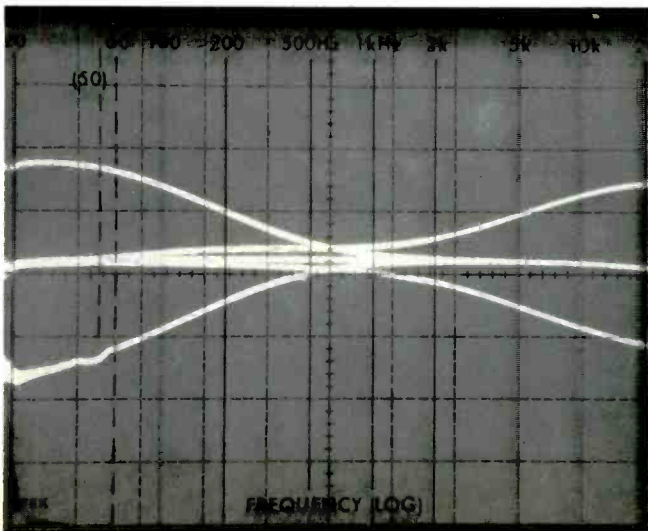


Fig. 3—Distortion vs. frequency with both channels driven at 65 W into 8 ohms.

Fig. 4—Tone control range of the Onkyo A-7 with turnover switches (A) set to 400 Hz and 2 kHz; and (B) at 125 Hz and 8 kHz.

A



RIAA equalization was accurate to within 0.2 dB of the "old" RIAA curve (new standards require an additional roll-off time constant at sub-sonic frequencies), but the combined use of the sub-sonic filter along with existing RIAA equalization comes very close to meeting the new RIAA standards.

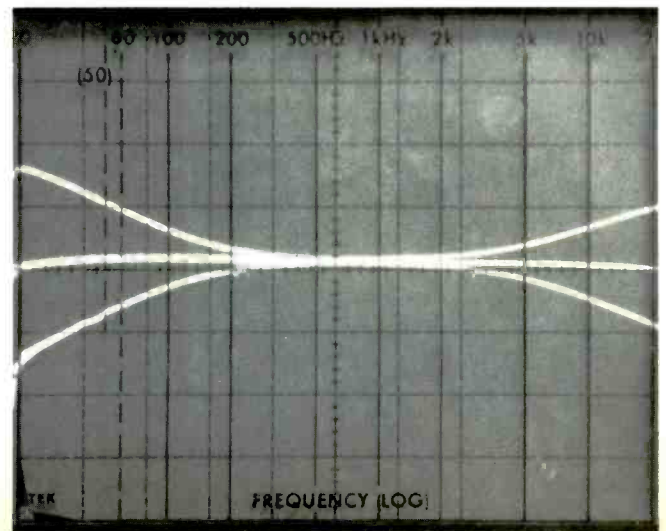
The advantages of having selectable turnover tone controls are clearly illustrated in the 'scope photos of Fig. 4. In Fig. 4(A) the 400-Hz and 2-kHz turnover points were selected, and tone control range is typical of most bass and treble controls. In Fig. 4(B), turnover points were switched to 125 Hz and 8 kHz, and the tone controls become more useful in adjusting extreme bass and extreme treble without adversely affecting mid-frequency musical response of the system.

Action of the sub-sonic filter, which has a cut-off point of 10 Hz, does not show up in the sweep-frequency 'scope photo of Fig. 5 since that sweep extends only from 20 Hz to 20 kHz. The action of the high-cut filter is clearly seen, however, and although its slope rate is only 6 dB per octave, its cut-off point is sufficiently high in frequency so that some small noise-reducing benefit is afforded without sacrificing too much in the fundamental musical frequency range.

### Listening and Use Tests

It took us only a few minutes to become familiar with the controls of the A-7. One gets the feeling, when operating this integrated amplifier, that all the controls and switches are just where they should be and all of them do their jobs positively and very smoothly. The outstanding thing we noted while listening to music reproduced via the A-7 was that it seemed capable of delivering more power than our bench measurements had indicated. Perhaps this is in part a result of the extremely flat power-band characteristic at the low end which, in turn, may be a result of the care that Onkyo

B



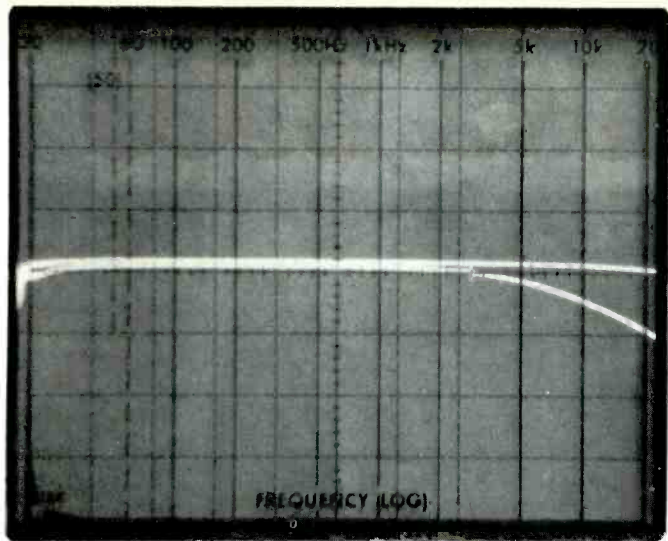


Fig. 5— The high-cut filter response of the Onkyo A-7.

took is designing that power supply to have such low internal impedance and to provide such great power reserve at the bass end. In any event, the A-7 sounded very good to our ears when coupled to a rather low-efficiency pair of sealed-enclosure speaker systems which have previously required upwards of 100 watts per channel to deliver the kind of clean, powerful sound we normally seek. Obviously, continuous power ratings do not tell the whole story, FTC power rule notwithstanding.

If a few of the frills normally found on some separate preamp/control units are missing from the A-7 (notable separate tone control of each channel, sensitivity selection of phono inputs, or cartridge impedance matching selection), these omissions are more than justified in an integrated amplifier that sells for as low a price as this one. Onkyo has, in our opinion, put together an integrated amp that offers excellent value for its price, both in terms of front panel functions and in terms of reproduced sound capability.

*Leonard Feldman*

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