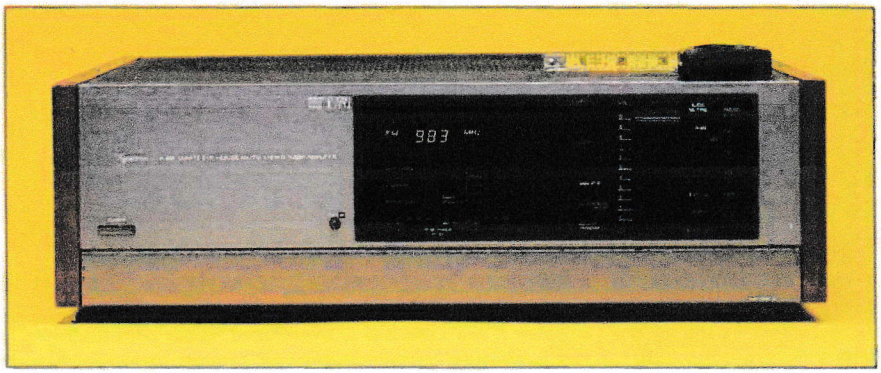
Equipment Test Reports

Hirsch-Houck Laboratories: Julian D. Hirsch and Craig Stark



KYOCERA R-851 AM/FM RECEIVER

HIRSCH-HOUCK LABORATORIES: JULIAN D. HIRSCH

KYOCERA'S R-851 digital-synthesis receiver has an audio-amplifier section rated to deliver 85 watts per channel into 8-ohm loads from 20 to 20,000 Hz with no more than 0.015 per cent harmonic or intermodulation distortion. In normal operation, its front panel presents a simple, uncluttered appearance, with no visible knobs. Almost half the area of the metallic-gray panel is blank except for the POWER pushbutton near its left edge. A black control-display area occupies most of the right side of the panel. This contains the digital frequency readout and LED's showing FM signal strength, relative audio power output, and the FM tuner's operating status as well as a number of black pushbuttons or pushplates for tuning and input selection. Other pushbutton controls include a 20-dB AUDIO MUTING switch and two TAPE COPY switches for dubbing between two decks. The volume control is a vertical slider.

Despite this apparent simplicity, the R-851 is an unusually versatile and full-featured receiver. Pressing the lower-right corner of the panel causes a full-width door to swing down, revealing additional pushbuttons, knob controls, and a headphone jack. There are three tone controls (bass, midrange, and treble), each of which has eleven detented knob settings and a continuously adjustable turnover to vary the affected frequency range. The bass-control turnover frequency can be varied from 100 to 500 Hz, and the treble turnover-frequency range is 2,000 to 10,000 Hz. The frequency of maximum effect for the MID control can be varied between 500 and 2,000 Hz, giving the R-851 a quasiparametric capability.

The only other knob is the balance control. Small pushbuttons select two pairs of speaker outputs, tone-control bypass, "subsonic" and high-cut filters, FM muting threshold, i.f. bandwidth, stereo channel blend, FM de-emphasis (75 or 25 microseconds), loudness compensation, stereo/mono mode, and moving-magnet (MM) or moving-coil (MC) phono preamplification.

The FM tuner section has an AUTO TUNING mode in which the i.f. bandwidth switches to narrow (lighting the IF NARROW indicator) whenever adjacent-channel interference occurs. Simultaneously with the bandwidth reduction, an "antibirdie" audio filter goes into operation to further reduce audible interference. Normal i.f. bandwidth can be restored only by tuning to another station or by pressing the AUTO/MANUAL button, which also shuts off the muting circuit in its MANUAL position. Either bandwidth can be selected at any time in the manual mode by pressing the IF button behind the door.

The rear apron of the R-851 contains the usual signal input and output jacks, two sets of insulated spring-loaded speaker-output connectors, and a hinged AM ferrite-rod antenna. There are binding posts for an external wire AM antenna and an F-type coaxial connector for a 75-ohm FM antenna. A 300-to-75-ohm matching transformer is furnished with the receiver for use with 300-ohm FM antennas. There are three a.c. outlets, one of them switched. Including the walnut-finish wood side plates, the R-851 is 18⅛ inches wide, 14 3/16 inches deep, and 5 3/16 inches high. It weighs 27 pounds. Its styling matches that of other Kyocera audio products. Price: $850. Kyocera International, Inc., Dept. SR, 7 Powder Horn Drive, P.O. Box 4227, Warren, N.J. 07060-0227.

● ***Laboratory Measurements.*** The output transistors of the Kyocera R-851 are cooled by large heat-sink fins located near the left rear of the receiver. The top-plate grille above the fins became very warm during the one-hour preconditioning and the subsequent high-power testing. Its ventilation should not be restricted if it is played at constantly high levels.

The amplifier section's 85-watt rating proved to be extremely conservative. With both channels driving 8-ohm loads at 1,000 Hz, the output waveform clipped at 110 watts per channel. Into 4-ohm loads, the clipping power was 149 watts, and even with 2-ohm loads the R-851 delivered a potent 120 watts per channel. The dynamic-headroom measurements showed that the power output into low load impedances is limited by the power-supply regulation rather than by any internal protective circuits (none of which were triggered during our tests of the receiver). With the prescribed 20-millisecond tone-burst signal, the clipping output into loads of 8, 4, and 2 ohms was 136, 213, and 265 watts, respectively. Since the receiver is rated only for 8-ohm loads, its clipping headroom was 1.12 dB and its dynamic headroom 2.05 dB.

Driving 8-ohm loads, the distortion of the amplifier section rose from about 0.005 per cent at 10 watts (it was below the noise level at lower power outputs) to 0.017 per cent between 70 and 100 watts.

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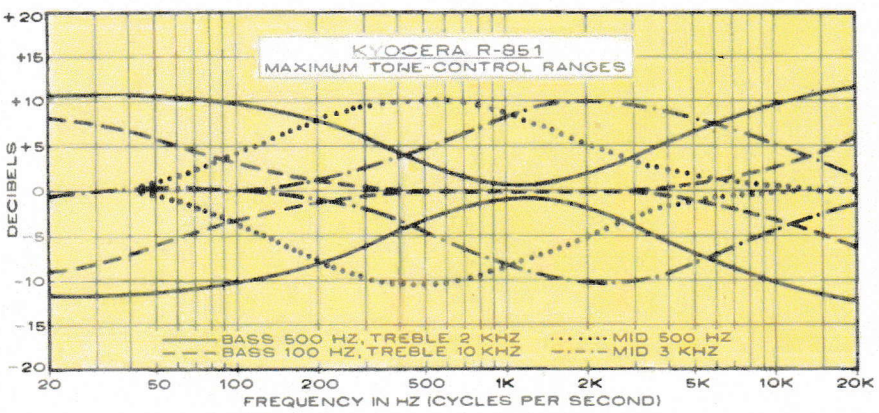
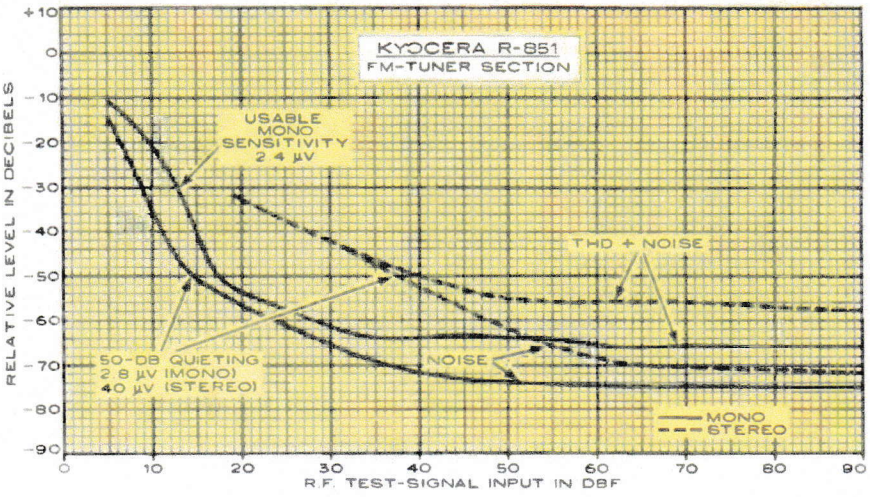


With 4-ohm loads the characteristic was similar, the distortion climbing from 0.0065 per cent at 10 watts to 0.03 per cent in the 50- to 120-watt range. Even 2-ohm operation did not significantly degrade performance; the distortion measured about 0.017 per cent from 10 to 30 watts and 0.05 per cent at 100 watts. The amplifier distortion was nearly independent of frequency. At 85 watts output (into 8 ohms) it ranged from 0.004 to 0.008 per cent between 20 and 20,000 Hz. At half power the distortion range was 0.002 to 0.005 per cent, and at one-tenth rated power it was below 0.002 per cent up to 10,000 Hz, reaching 0.005 per cent at 20,000 Hz. The power-amplifier's slew factor exceeded 25, and it was stable with simulated speaker loads.

The tone controls of the R-851 were able to tailor its frequency response to a remarkable degree, limited only by the user's hearing acuity and taste (see the graph on page 26). They could be set to produce barely audible modifications of the response at the upper and lower frequency extremes and almost anywhere in the midrange, or they could be made as heavy-handed in effect as the majority of tone controls. The choice is up to the user. The receiver's loudness compensation boosted both lows and highs (the latter only slightly) and made the sound too heavy for our taste. The "subsonic" filter reduced the response by 3 dB at 20 Hz (it is said to have a 12-dB-per-octave slope at lower frequencies), and the "high" filter (which has a 6-dB-per-octave ultimate rolloff) reduced the response by 3 dB at 5,000 Hz.

The RIAA phono equalization was very accurate, within ± 0.5 dB from 20 to 20,000 Hz, and it was negligibly affected by cartridge inductance. The phono-preamplifier input (MM) was 47,000 ohms at 1,000 Hz, although it could not be defined as a simple combination of a resistance and a capacitance. Amplifier sensitivity (AUX) was 17 millivolts (mV) for a 1-watt output, with a −74-dB noise level (A-weighted). The sensitivity was 0.23 mV through the phono (MM) input, also with a −74-dB noise level. The phono preamplifier overloaded at 150 to 160 mV, depending on frequency. We did not test the MC input, but its voltage gain is specified as twenty times that of the MM input, with a 100-ohm impedance.



The FM-tuner section had a mono usable sensitivity of 12.8 dBf (2.4 microvolts, or µV). The stereo sensitivity was set by its switching threshold of 19 dBf (5 µV). The muting threshold was switchable from about 19 dBf (LO) to 43 dBf (HI). The 50-dB quieting sensitivity was 14.1 dBf (2.8 µV) in mono and 37.2 dBf (40 µV) in stereo. The tuner distortion in mono (at 65 dBf, or 1,000 µV) was 0.05 per cent, approximately the residual of our signal generator, and in stereo it was 0.165 per cent. The corresponding noise levels were −75 and −70.5 dB.

The stereo FM frequency response was ±1 dB from 30 to 15,000 Hz, and the channel separation was about 43 dB through most of the low- and middle-frequency range, decreasing to 39 dB at 30 Hz and 24 dB at 15,000 Hz. Other FM-tuner performance parameters included a capture ratio of about 1.3 dB (narrow i.f.) or 2 dB (wide i.f.), AM rejection of 65 to 67 dB, and a very good image rejection of 88 dB. The narrow-i.f. alternate-channel selectivity was an excellent 83 dB, and in wide-band it was 44 dB, more than adequate in our suburban location. The corresponding adjacent-channel selectivity readings were 12 and 2.7 dB. The 19-kHz pilot-carrier leakage into the audio was a very low −78 dB, and the tuner hum was −70 dB. The frequency response of the AM-tuner section was typical: flat within ±1 dB from 25 to 1,500 Hz and down 6 dB at 3,000 Hz.

● ***Comment.*** The Kyocera R-851 made a strongly favorable impression on us, not only because of its excellent performance, but because it handled so smoothly and never sounded anything but first-rate. It is also, as far as we could tell, a bug-free receiver, with not a trace of switching transients or other unwelcome side effects. Even its FM signal-strength lights, operating at intervals of 6 to 12 dB, are truly useful as an aid toward orienting an antenna, not merely cosmetic.

The three-band quasiparametric tone controls are extremely useful and versatile compared with the ordinary tone controls found on most receivers and preamplifiers. The only awkward aspect of the R-851's operation was the taper of the volume control, which produced uncomfortably high listening levels when playing FM broadcasts at any setting above 3 (out of a range of 10). On the other hand, there was no distortion at higher levels since the amplifier section is certainly not prone to clipping.

We never really determined the true limits of the amplifier section. No doubt our previous sad experiences with lesser products made us overly cautious. In any case, our listening tests and measurements of its dynamic headroom and low-impedance output clearly showed that the Kyocera R-851 is an unusually muscular and conservatively rated receiver.

Circle 140 on reader service card

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***"I'll call Bill Spencer, sir. He's 6 feet 8 and weighs 305 pounds. He'll tell you what you can do with your turntable if you buy this Compact Disc player! Bill, oh* Bill . . . !**