Equipment profiles

Nikko Model 9095 AM/FM Stereo Receiver

MANUFACTURER'S SPECIFICATIONS

FM Tuner Section

IHF Usable Sensitivity: 1.8 μV (10.3 dBf), mono.
50-dB Quieting Sensitivity: Mono, 3.0 μV (14.7 dBf).
Selectivity: 70 dB.
S/N: Mono, 70 dB.
Image Rejection: 85 dB.
I.F. and Spurious Rejection: 100 dB.
AM Rejection: 50 dB.
THD, 1 kHz: Mono, 0.2 per cent; stereo, 0.5 per cent.
Frequency Response: 20 Hz — 15 kHz, +0.5, −1.5 dB.
Stereo Separation: 1 kHz, 40 dB.
Sub-Carrier Suppression: 60 dB.

AM Tuner Section

Sensitivity: Ext. antenna, 250 μV/M.
Selectivity: 25 dB.
S/N: 55 dB.
Image Rejection: 60 dB.
I.F. Rejection: 60 dB.

Amplifier Section

Power Output: 63 watts per channel, 20 Hz to 20 kHz, 8 ohm loads. 68 watts at 4 ohms.
Rated THD: 0.3 per cent.
Rated IM: 0.3 per cent.
Damping Factor: 40 at 8 ohms.
Input Sensitivity: Phono, 2.1 mV; Aux 1 and Tape Mon. 1&2, 200 mV; Aux 2, 350 mV.
Phono Overload: 170 mV.
S/N: Phono, 75 dB, IHF A weighted; Mike, 70 dB; High Level, 90 dB.
Bass Range: ±10 dB @ 70 Hz.
Treble Range: +10 dB @ 10 kHz.
Mid-Range Control: ±6 dB @ 1 kHz.
Low Filter: −7 dB @ 70 Hz.
High Filter: −6 dB @ 7 kHz.

General Specifications

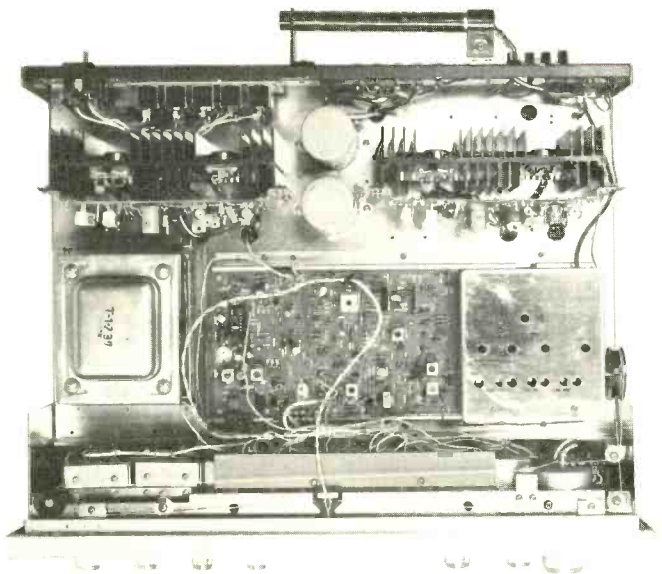
Power Consumption: 300 watts.
Dimensions: 19 in. (48.26 cm) W x 6½ in. (16.5 cm) H x 15¼ in. (38.7 cm) D.
Weight: 36.3 lb. (16.5 kg).
Price: $519.95.

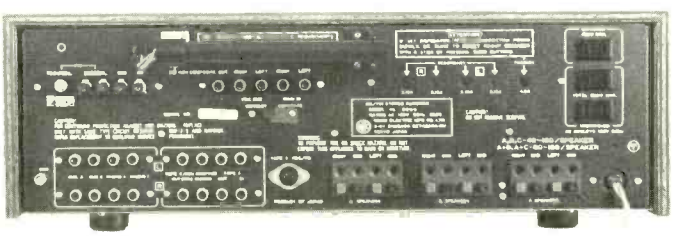
Nikko's top receiver joins the growing list of all-in-one components which offers audiophiles a convincing argument against the need for separate amplifiers, preamplifiers, and tuners. Its price is in line with other receivers of its power output capability, and its designers have taken pains to include enough switching and control features to gladden the hearts of most inveterate knob twirlers and button pushers. In deciding upon front panel layout, Nikko seems to have taken a mid-course between the traditional "black out" dial and the newer, highly visible, light-colored dial arrangements which many manufacturers have begun to use in recent years. The background color behind the dial glass is light in color, and therefore the frequency scales are somewhat visible even with power turned off. When power is applied, however, the background color recedes and the vivid blue numbers predominate. Neither the FM nor the AM frequency scales are linearly calibrated (though the FM is close to being so), and while the frequency demarcations are visually attractive, they do not lend themselves towards accurate pin-pointing of selected frequencies—especially in

our crowded listening area where stations are seldom more than 400 kHz apart.

Above the frequency scales are illuminated notations which indicate program source selection as well as stereo FM reception. To the left of the scales are a pair of tuning meters. Only the signal strength meter is illuminated when AM is chosen, while both meters are lit when FM is being tuned in. For other program sources, the meters go dark. A tuning knob, coupled to a flywheel and pointer, is located at the right of the dial area. The tip of the pointer is illuminated when either AM or FM program sources are selected.

Rotary control knobs along the lower section of the panel include a speaker selector switch (which also turns on power), with positions for various combinations of one or two out of three possible pairs of speaker listening and an "off" position for the headphones-only listening; bass, midrange, and treble tone controls; volume control, and program selector. Pushbuttons in this panel area activate low- and high-cut filters, mono/stereo switching, FM muting circuits,





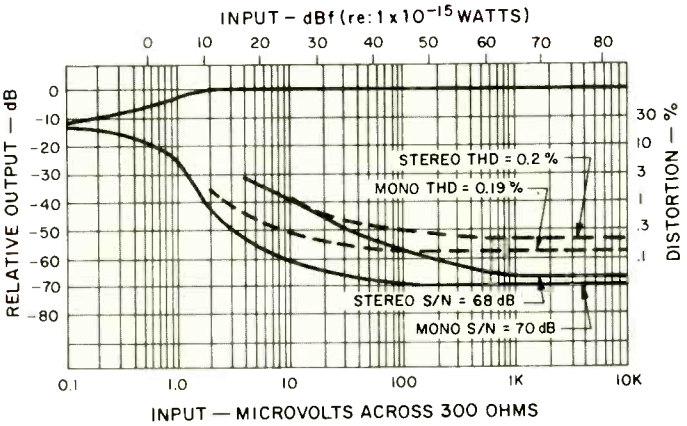


Fig. 1—FM quieting and distortion characteristics.

loudness circuit, and two tape monitor circuits. It is in the tape monitoring circuit configuration that Nikko might have provided a bit of additional utility for, although dubbing is possible from either one or two decks to the other, when the dubbing function is selected (by means of the main program selector), it is not possible to listen to anything but one of the tape decks (unlike the case with some other albeit higher priced receivers and amplifiers where dubbing can take place while listening to still another program source, such as records or AM/FM).

Along the bottom edge of the panel are phone jacks, tape 2 in and out jacks (duplicating those on the rear panel for front access), and a microphone (mono) input jack. Next to the mike input jack is a slide mike level control which works independently of the master volume control and therefore permits mike mixing with any of the other available program sources. A center-detented slide control takes care of left-right channel balance.

The rear panel of the 9095 features three sets of speaker push-terminals which, when depressed, permit insertion of the stripped speaker wire ends into tiny holes. Preamp-out and main amp-in jacks are internally interconnected (or disconnected) by means of an adjacent slide switch. A jack labelled "composite output" is intended for future use with 4-channel FM adaptors. A coaxial connector is provided for 75-ohm line connection, while conventional screw-cap terminals are available for 300-ohm and external AM antenna connections. Five tiny circuit-breaker re-set buttons eliminate the need for replaceable line and power supply fuses. Even though the program selector shows only one *Aux* position, there are two sets of *Aux* input jacks, each having a different input sensitivity. The user chooses one set (but not both) to more closely match loudness levels of other internal sources or the phono levels when connecting a program source to *Aux*. Two turntables can be used with the receiver. In addition to the tape-in and tape-out jacks, there is a familiar DIN multiple pin socket to take care of decks equip-

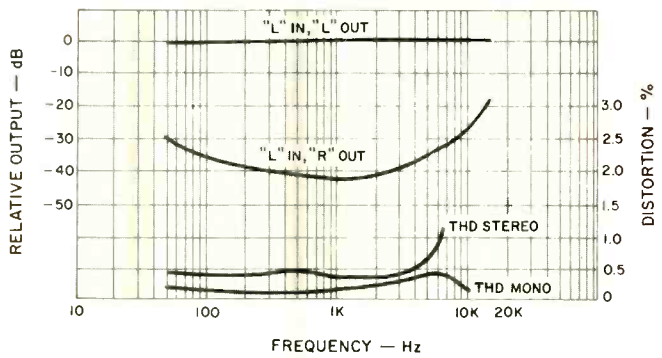


Fig. 2—Separation and distortion vs. frequency.

ped with that type of connector. One switched and two unswitched a.c. receptacles, a chassis ground terminal, and a pivotable AM ferrite bar antenna complete the rear panel layout.

Internal layout of the Nikko 9095 may be seen in the accompanying photo. The entire tuner section, including multiplex circuitry, is contained on the largest of several P.C. boards, with the shielded r.f. front-end mounted directly to that major assembly. Two identical power amplifier modules are integrally tied to heat sink assemblies near the rear of the unit. The owner's manual contains no information regarding the circuitry of the receiver (nor is a schematic diagram supplied) other than to tell us that "the system embodies many of the most advanced technological accomplishments—including FET (Field Effect Transistors), IC (Integrated Circuit), and the exclusive Nikko Circuit Breaker System." Physically, the layout seemed quite orderly and logical, and power supply parts seemed adequate for the rating of the receiver. During our subsequent lab measurements we noted that a fair amount of heat developed at the rear of the chassis and the power transformer was rather warm even after short periods of high-power testing.

FM Measurements

Significant quieting and distortion measurements are plotted in Fig. 1. Usable sensitivity was reached with a signal input of 2.0 μV (11.2 dBf) in mono and was determined by the switching threshold (12.0 μV/26.6 dBf) in stereo. The 50-dB quieting mark required 3.5 μV (16.1 dBf) of signal in mono, 40 μV (37.2 dBf) for stereo. S/N reached its best value of −70 dB in mono for strong signals, while in stereo, best S/N obtained was −67 dB, after filtering out a very small amount of sub-carrier product from the output waveform. Distortion at 1 kHz measured 0.17 per cent in mono, 0.37 per cent in stereo, both measurements exceeding published claims.

Capture ratio measured 1.5 dB, a bit better than claimed, while selectivity, image, i.f., and spurious rejections were all almost exactly as claimed. AM suppression exceeded claims, measuring some 53 dB.

Stereo separation at 1 kHz measured 42 dB, decreasing to 35 dB at 100 Hz, and to 26 dB at 10 kHz. Separation as well as distortion versus frequency for mono and stereo are plotted in Fig. 2.

AM Measurements

AM sensitivity, measured via the external antenna input, measured 20 μV, while selectivity was a bit better than claimed, with readings of 27 dB at 1 MHz. Signal-to-noise ratio with strong signals was 50 dB, short of the claimed 55 dB but still excellent for any AM circuit in a self-contained receiver. Distortion measured 1.2 per cent for 30 per cent modulation in AM, and both image and i.f. rejection exactly measured the 60 dB claimed.

Amplifier Measurements

As we might have guessed from the unusual power rating given to the 9095 by its makers (63 watts—neither 60 watts nor 65 watts), this per channel rating turned out to be just exactly what the amplifier can deliver with both channels driven, at 20 Hz and 20 kHz, the FTC power band which they specify. At mid-frequencies, the amplifier delivered 66.1 watts at the rated THD of 0.3 per cent. Were we sitting in Nikko's shoes, however, we would have been more inclined to rate the unit at 60 watts per channel, from 20 Hz to 20 kHz, 8 ohm loads, for the 0.3 per cent THD level, since it is entirely possible that out of 100 units, one might not squeak through and would read, say, 62.5 watts at 20 Hz, providing a "test case" for the FTC to pounce on. The IM distortion (plotted along with THD in Fig. 3) just made the 0.3 per cent rated value for an equivalent power output of 63 watts, as claimed. Of course, at all lower power output levels, THD drops to insignificant levels.

Fig. 4 shows THD at different frequencies for the rated power output level of 63 watts. At mid frequencies, the level

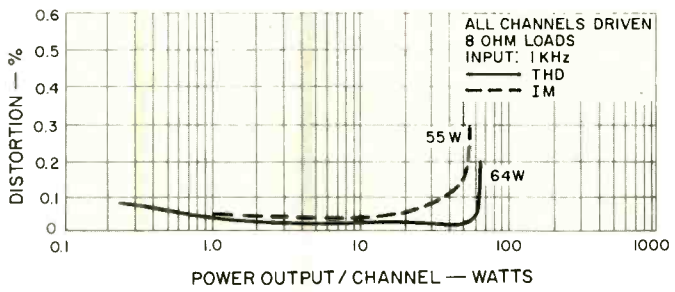


Fig. 3—Harmonic and intermodulation distortion characteristics.

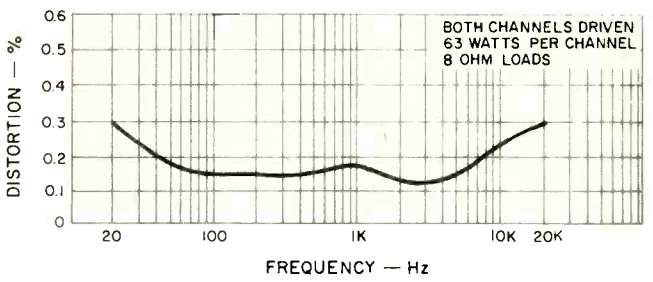


Fig. 4—Distortion vs. frequency, both channels driven 63 watts into 8 ohms.

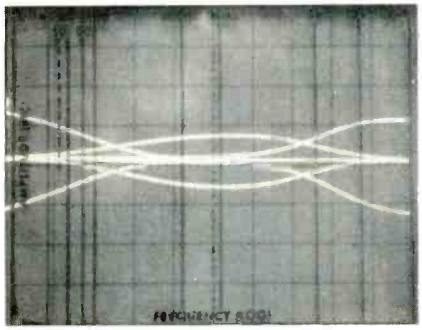


Fig. 5—Bass, mid-range, and treble control range.

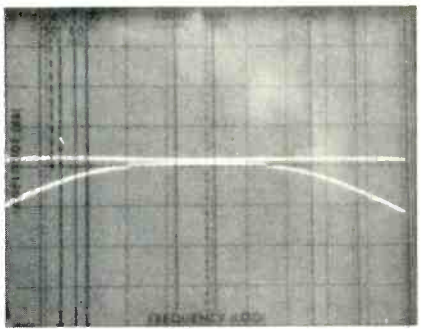


Fig. 6—Low- and high-cut filter response.

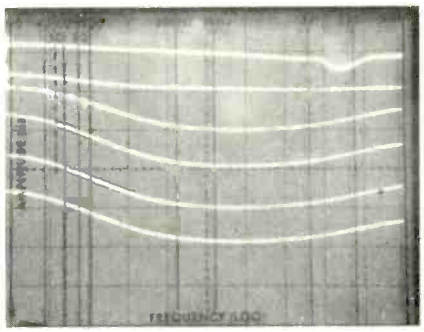


Fig. 7—Loudness control characteristics.

of THD hovers around the 0.15 per cent point for that power output level.

The phono inputs required 2.7 mV of signal input (at 1 kHz) to drive the receiver to rated output. Overload was evident with signal inputs of 150 mV, a bit short of the 170 mV claimed, but more than adequate to accommodate a wide variety of cartridges playing even the most heavily modulated record grooves and recorded transients in music. RIAA equalization was accurate to within 0.5 dB from 30 Hz to 15 kHz. Phono hum and noise, measured without any weighting, was 73 dB below rated output, referenced to input sensitivity (2.7 mV). This is an excellent measurement which, if translated to a 10 mV input signal reference used by many competing manufacturers, would become 84.4 dB—and that without any weighting network!

The two sets of *Aux* inputs had input sensitivities of 180 mV and 350 mV, and hum and noise of these high-level positions was some 85 dB below rated output. At minimum volume settings, hum and noise decreased to a −88 dB below rated output.

The range of the bass, treble, and mid-range tone controls of the Nikko 9095 was plotted by means of a sweep system in our spectrum analyzer and recorded on the scope face. The photo of Fig. 5 shows the range of each of these controls as a composite series of traces. In our opinion, the mid-range control operates over too wide a portion of the audio spectrum, affecting upper bass and lower treble to a degree not commonly associated with "presence" controls. This, however, is a matter of personal taste, and one can, of course, use this or any other tone control with discretion—or not at all. As for the low- and high-cut filters (action of these controls is shown in the scope photo of Fig. 6), they are about as effective as scratch or rumble filters as the bass and treble controls would be, because action (beginning of "cut") extends too far into the useful mid-range region for each filter.

Loudness compensation circuits include both bass and treble emphasis in the Nikko 9095, and response in 10-dB increments (beginning with the control fully clockwise) is shown in the scope photo of Fig. 7. (Note: The "glitch" in the top curve resulted from instrumentation and not from any odd quirk in the receiver.)

Use and Listening Tests

In listening to the FM performance of the Nikko 9095, we were at once aware of what, to us, seemed like slightly overemphasized highs. Checking frequency response, we discovered that the de-emphasis was a bit off and that at 15 kHz (where most receivers actually roll off more than the prescribed amount—17.07 dB), de-emphasis resulted in a rolloff of only 13 dB. In other words, at 15 kHz there was about 4 dB of net treble boost. One downward click of the treble control (which has detented or click-stop positions) corrected this flaw and things sounded fine. Sensitivity was excellent, and there was no trouble from alternate channel interference at any point on the FM tuning dial. Muting threshold was a bit on the high side (we had measured it at 14 μV/28.1 dBf), which meant that we had to forego the luxury of interstation noise muting to pick up those really weak signals we use to check product sensitivity, in a practical way, at our listening location. On the other hand, since muting is set at just about the same point as stereo switching, one can almost use the muting feature as a means of insuring that those stereo stations which manage to overcome the muting threshold will also be heard in full stereo without having to worry about stereo switching sensitivity.

Whether you choose to rate the Nikko 9095 as either a 63 watt or a 60 watt per channel receiver, it is a powerful audio component, one which can drive some of the more familiar high-quality acoustic-suspension speaker systems to good, solid sound levels with no evidence of clipping, either aurally or visually with a scope connected to monitor what's happening on transient peaks.

Under musical listening conditions, the heating condition experienced during bench testing was not a problem at all, proving once again that sine-wave testing shows relatively little about the thermal capabilities of a given piece of equipment when it is called upon to amplify musical signals.

Front panel controls work smoothly and are arranged for ease of use and understanding. Aside from the tape-dubbing limitation, the tape facilities are good, and the availability at the front panel of the tape 2 in and out jacks make it easy to connect a friend's tape deck for tape copying without having to climb around the rear of the unit, if it is installed in a fixed location. The extra mike input, though mono, provides added flexibility for those few who want to perform as well as listen (only high impedance mikes are suitable, however).

At its suggested retail price, the Nikko 9095 certainly offers a great deal of control flexibility, as many inputs as one might reasonably expect to find even on some of the better "separates," and performance that warrants the asking price.

Leonard Feldman