

Rotel Model RT-320 AM/FM Stereo Tuner

MANUFACTURER'S SPECIFICATIONS

FM SECTION. IHF Sensitivity: $2.2 \mu\text{V}$. S/N Ratio: Better than 65 dB. THD: Less than 1.0%. Image Rejection: 60 dB. IF Rejection: 80 dB. Selectivity: 45 dB. Stereo Separation: 35 dB @ 1 kHz. Spurious Response: 80 dB. Capture Ratio: 3dB.

AM SECTION. IHF Sensitivity: $25 \mu\text{V}$. Image Rejection: 50 dB @ 1MHz. IF Rejection: 50 dB @ 1MHz. Selectivity: Better than 30 dB. S/N Ratio: 50 dB.

GENERAL. Power Requirements: Either 100, 117, 200, or 240 V. a.c., 50/60 Hz. Dimensions: 14 in. W. \times 7½ in. D. \times 4½ in. H. Price: \$119.00.

To get reasonable performance in a separate tuner component, the audio enthusiast intent upon assembling his system from separate components has generally had to pay a great deal more than \$119.00—the suggested list price of this neatly designed solid-state tuner from Roland Electronics Co., Ltd. of Tokyo, Japan. Matched with its companion amplifier, Model RA-310, which bears a similar price tag, the user who desires the flexibility associated with separates but faced with a budget limitation of around \$250.00 can come up with a pair of winners that's hard to beat in the current market. The RT-320 tuner comes complete in its own enclosure consisting of a black metal top, flanked by two oil-walnut side panels. This treatment surrounds a simple but elegant black and gold front panel which features only three push buttons and a good-sized tuning knob coupled to an effective flywheel. The buttons are of the "push-push" type and serve as POWER switch, MONO-STEREO selection, and AM-FM selection. The calibrated dial scale is illuminated in green when power is applied and the dial pointer also becomes brightly illuminated through use of a miniature travelling lamp and the plastic, light-transmitting material of which the pointer is constructed. A peak-reading signal strength meter is located at the right of the dial scale and, just above it, the illuminated word STEREO appears when a stereo station is tuned in.

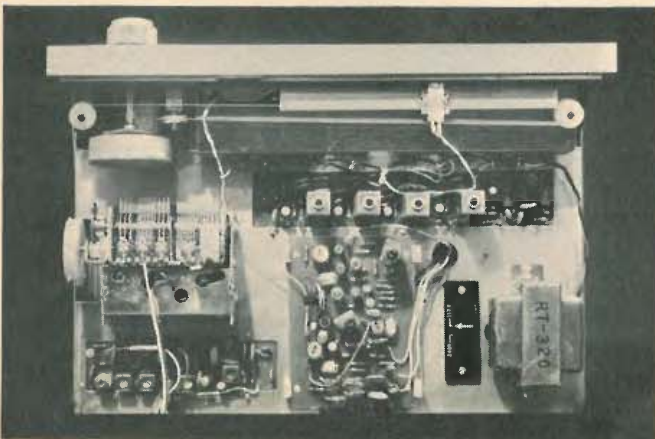


Fig. 1—Internal view of the RT-320 chassis.

Rear panel layout includes terminals for 300-ohm antenna input as well as terminals for an external AM antenna, if desired. Right channel and left channel output jacks and the usual built-in AM loopstick complete the rear layout.

A look at the internal chassis discloses a separate, sealed FM front-end assembly, which also contains the AM variable capacitor but, as is the case with much more costly sets, separate AM and FM i.f. sections are used. Circuitry is, for the most part, conventional in both of these sections, utilizing bi-polar transistors throughout in the four FM i.f. stages. The multiplex section is of the switching type and is "gated on" by a novel threshold circuit shown in the partial schematic of Fig. 2. Adjustment of VR-101 varies both a.g.c. level to earlier i.f. stages and also sets up the bias level at the output of the pair of d.c. coupled amplifiers which alters the gain of the 38 kHz amplifier in the MPX section of the tuner (not shown in the schematic) to determine the optimum point at which the stereo circuitry is "gated on" based upon adequate signal strength and noise-free reception.

Performance Measurements

The manufacturer's specifications listed at the beginning of this review were taken from the manufacturer's descriptive literature. Customer's instruction booklets supplied with the unit list somewhat more conservative specifications and, upon conferring with the manufacturer to determine the reason for this discrepancy we were told that the manuals were written and printed before production began and that, in fact, the production runs have actually proven to provide better specs than were anticipated. We can confirm from our own measurements that this is true. In fact, some of the measurements turned out to be better than the revised specifications too. Important FM performance specs are shown in Fig. 3. IHF sensitivity of the unit we tested was $2.0 \mu\text{V}$, as opposed to the $2.2 \mu\text{V}$ claimed. (The earlier booklet claimed $2.5 \mu\text{V}$.) THD in mono was 0.8%, while in stereo this figure goes to 1.0%. Ultimate signal-to-noise was an impressive 67 dB, while full quieting was achieved at a signal input of $2.7 \mu\text{V}$. Quieting is quite steep, reaching 50 dB of S/N at a mere $3 \mu\text{V}$ input. Stereo FM separation shows a mid-band figure of 36.5 dB as opposed to 35 dB claimed. Separation holds very well all the way down to 50 Hz but decreases at the high end, reaching 15 dB at 15 kHz. In terms of aurally perceived stereo separation at the high end, this figure is still more than adequate.

Although the AM circuit is extremely simple (a converter stage followed by two conventional i.f. stages), we were pleased to find that AM performance was excellent—better than that measured in some receivers which include a separate r.f. stage. For example, the AM IHF sensitivity was measured as $15 \mu\text{V}$ (through the external AM antenna terminals, using a

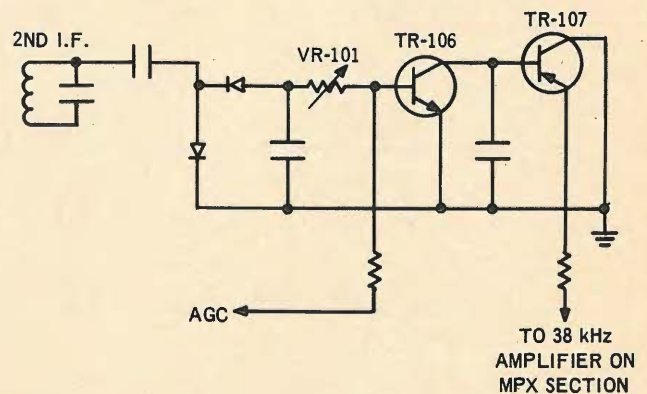


Fig. 2—Combination a.g.c. and stereo threshold circuit used in the RT-320. TR-106 and TR-107 determine bias setting of MPX 38 kHz amplifier.

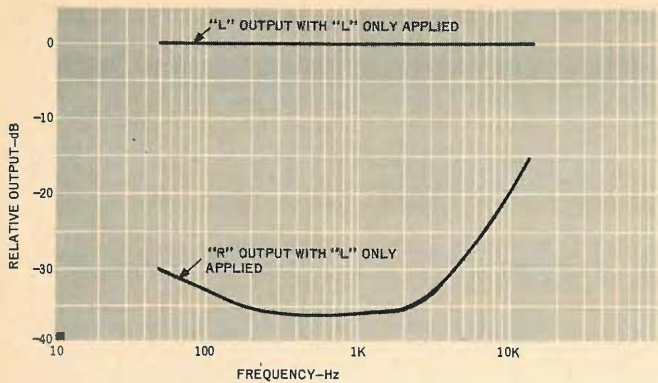


Fig. 3—FM performance characteristics.

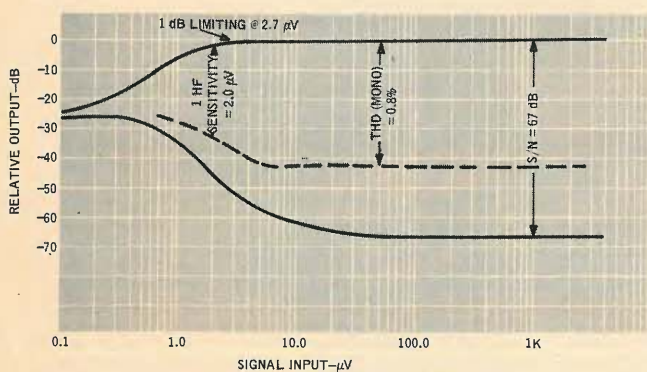


Fig. 4—Stereo separation characteristics.

recommended dummy load) as opposed to the $30\ \mu\text{V}$ claimed by the manufacturer. Proper a.g.c. circuit design and optimization of the operation point of each stage accounts for this excellent performance from what appears, schematically at least, to be a minimal circuit.

Output level from AM, at 30% modulation and with 1 mV of signal applied, measured 0.5 volts and signal-to-noise ratio for this level of input was 50 dB, exactly as claimed, while AM selectivity measured 35 dB, a bit better than claimed. In FM, 30% modulation resulted in an output of 0.4 volts rms at 400 Hz. Since the tuner is not equipped with an output level control, these output figures are important in terms of compatibility with associated amplifier equipment. When used with the matching RA-310 amplifier, its volume control settings for these outputs were "comfortably" at mid-rotation for room-filling listening levels.

Listening Tests

The RT-320 pulled in some 53 listenable FM signals using our outdoor multi-element directional antenna. Some 22 of these were stereo signals, of which three were somewhat noisy and would be considered "fringe area" signals. This tabulation confirms the excellent sensitivity figures measured and is typical of the results we expect in this location with a "2 microvolt" set. There is little point in mentioning some of the features that *might have been included* when one remembers the price of this well-designed tuner. Engineering has concentrated on straight performance and has omitted the "extras" in the interest of coming up with a low-cost product that fills a real need in a category where, to our knowledge, no such product existed before. In summary, the RT-320 looks and acts like its higher priced cousins and, whether you're just starting to assemble a component system or need to add a tuner to your "audio-till-now" components, don't overlook this one.—Leonard Feldman

Check No. 61 on Reader Service Card



STUDIO 4 makes great sound twice as good!

Size: $3\frac{7}{8}$ " high, $9\frac{7}{8}$ " wide, $4\frac{5}{8}$ " deep



You have 4 channels in your present stereo. Utah's STUDIO 4 and two more speaker systems will reveal the other 2 channels

There are 4 channels in your present Stereo System. Studio 4 and two more speakers will reveal them. Use your present amplifier. Use your regular stereo records or tapes. Use your present FM stereo broadcasts. For the first time your room will come completely, fully alive. Impossible? STUDIO 4 has a switch for both 2 channel and 4 channel sound. Switch easily from your present 2 channel great sound, to 4 channels. Your great sound becomes twice as good.

NET \$39.95



For complete information write:




UTAH ELECTRONICS
1124 East Franklin Street
Huntington, Indiana 46750

Check No. 62 on Reader Service Card