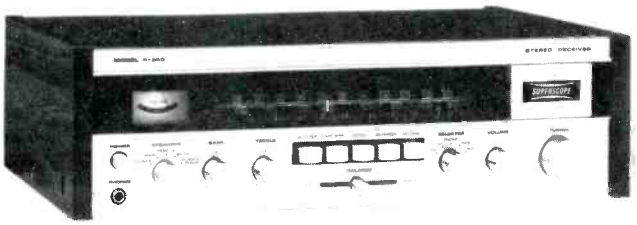
Equipment Profiles

Superscope R-350 AM/FM Stereo Receiver



MANUFACTURER'S SPECIFICATIONS

TUNER SECTION: **IHF Sensitivity**: 2.8 μV. (50 μV for 55 dB quieting). **THD**, Mono: Less than 0.6%; Stereo: Less than 1.5%. **Capture Ratio**: 3.0 dB. **Selectivity**: Greater than 40 dB. **IF Rejection**: 75 dB. **Image Rejection**: Better than 45 dB. **Spurious Rejection**: 84 dB. **AM Suppression**: Better than 35 dB. **AM IHF Sensitivity**: Better than 40 μV. **FM Frequency Response**: 20 Hz to 15 kHz ± 1.5 dB. **Stereo FM Separation**: 35 dB @ 1 kHz.

AMPLIFIER SECTION: **Power Output**: 25 watts/channel continuous, both channels driven, 8 ohm loads. **THD**: Less than 1.0% @ 1 kHz. **Power Bandwidth**: 15 Hz to 40 kHz. **Frequency Response**: 20 Hz to 20 kHz ± 1 dB. **Phono Response**: RIAA ± 1 dB. **Noise**: AUX, −70 dB. **Phono Noise**: 4 μV (56 dB below 2.5 mV). **Input Sensitivity**: Phono, 2.5 mV; High Level, 160 mV. **Loudness Control**: +8 dB @ 100 Hz, +3 dB @ 10 kHz. **Bass Control**: ± 10 dB @ 100 Hz. **Treble Control**: ± 10 dB @ 10 kHz.

GENERAL SPECIFICATIONS: **Dimensions**: 16⅞ in. W. x 5 in. H. x 12⅝ in. D. **Weight**: 20.25 pounds. **Price**: $279.95.

From the people who bring you Sony tape recorder products and Marantz components comes a new line, bearing their corporate name, Superscope. The top-of-the line Model R-350 stereo receiver sells for a bit less than the Marantz 2220, one of the low-end models in that better known line, and therein lies the apparent objective in the introduction of this new brand—the design and production of components devoid of some lesser frills but offering excellent value for their price. The new line is designed in the U.S. and produced in Japan, as are most of the Marantz products, for that matter.

The new line bears little resemblance, physically, to the products of its corporate cousin, but has a distinctive look of its own, as can be seen in the photo of the complete receiver shown above. A light gold anodized front panel of extruded aluminum is surrounded by an included stain-resistant walnut-grain cabinet. The normally blacked-out dial area lights up in a bright magenta color when power is applied. Startling, at first, this bright color is certainly more visible at a distance than the more subdued shades of color used on many competitive products. The dial pointer is separately illuminated in red when AM or FM reception is selected, and illuminated words denote AM or FM reception. A similarly illuminated large signal-strength meter at the left of the dial area is operative in both AM and FM tuning. Below the dial area are the operating controls which include a separate power push-push switch, a speaker selector switch (including positions for PHONES, MAIN, REMOTE, BOTH and QUADRAPHASE, about which more later), bass and treble controls, program source selector switch, volume, tuning knob, and a horizontally mounted slide-type balance control. Five centrally located pushbuttons perform such secondary functions as high-filter introduction, tape monitoring, mono/stereo switching, loudness circuit and FM muting. The large tuning knob is coupled to a smooth-acting flywheel arrangement. A phone jack at the lower left of the panel completes the front panel layout.

The rear panel, shown in Fig. 1, includes refinements not normally encountered in a receiver selling for so low a price. There are, for example, push-type speaker binding posts which retain the stripped ends of speaker cables in place by spring action after they are inserted, preventing shorts and eliminating the use of any tools. Besides the usual antenna terminals (300 ohms for FM), phono, tape and aux input and tape monitor jack pairs there is a 4-channel FM detector output jack for possible future use with a discrete FM four-channel adaptor if and when the FCC approves a system for such broadcasts. A ground terminal, switched and unswitched convenience a.c. receptacles, a line fuse and the usual pivotable AM ferrite antenna complete the rear panel layout.

As can be seen in the photo of Fig. 2, the entire tuner section, including the stereo multiplex decoder circuit, is constructed on a single large p.c. board which is solidly mounted to the metal chassis. Power amplifier circuitry is mounted on a vertically positioned p.c. board which is

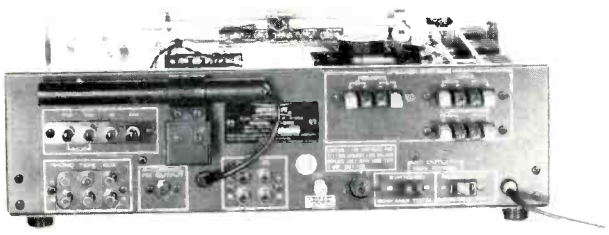


Fig. 1—Rear panel view of R-350 receiver.

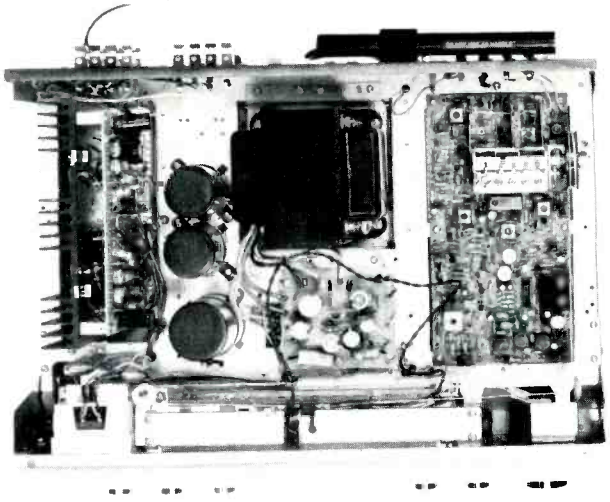


Fig. 2—Internal view of R-350 chassis.

mechanically fastened to a fairly large heat sink containing the four type 2SC14450 power output transistors. Other separate p.c. modules include those for preamplifier, tone and voltage amplifiers, power supply components, pushbutton switching circuitry and dial lamps. An FET is used as the r.f. amplifier in the FM front end, which incorporates a three-gang tuning capacitor. Bipolar transistors are used for the rest of the circuitry, with the exception of the stereo multiplex decoder section which employs a 16-pin integrated circuit. Power amplifiers are capacitively coupled to the speakers (2200 μF) in a conventional transformerless output arrangement powered at just under 54 volts on the upper collectors of each pair of NPN output devices. In all, there are 39 transistors, 24 diodes, 2 IC's and 1 FET in this receiver. A 4700 μF capacitor is used as the main filter in the high-voltage power supply.

Laboratory Measurements

Our measurements of the tuner section of the R-350 reflect some of the new measurement requirements proposed in the first draft of the new IHF Tuner Measurement Standards now under consideration by the Institute of High Fidelity. Referring to Fig. 3, the measured IHF sensitivity was 2.6 μV as against 2.8 μV claimed by the manufacturer. The 50 dB quieting signal strength measured was 4.3 μV while 55 dB of quieting was achieved at just over 10 μV of input signal, considerably better than the 50 μV listed by the manufacturer. THD at the 50 dB quieting point was already down to a low 1.5%, while ultimate THD at 1000 μV measured 0.4%. Note, however, that the mono THD characteristic shown in Fig. 3 is a bit unusual in that for signal strengths from around 10 μV to 100 μV, THD is actually lower than it is for stronger input signals of around 1000 μV.

Note that in stereo, THD reaches a low of 0.8% at 1000 μV of signal input. This characteristic is plotted only down to 30 μV, because that is the signal level at which the circuit automatically switches over to stereo operation. In our opinion, this threshold is set too high and, under typical listening conditions, may result in monophonic reception of signals broadcast in stereo that would be perfectly acceptable and sufficiently noise free in stereo mode. Muting level, too, was set too high by the manufacturer at 40 μV or so and anyone interested in receiving the maximum number of acceptable station signals would do well not to use this feature, or at least to defeat it when seeking distant signals.

Ultimate S/N measured 71 dB, a very respectable figure indeed. This cannot be compared with manufacturer's claims, since that specification is omitted by the manufacturer. Capture ratio measured exactly 3 dB at 100μV, and 3.5 dB at 1000 μV, conforming well to Superscope's claims. Image rejection was 55 dB while AM suppression was a bit better than claimed, measuring 40 dB. Spurious rejection fell a bit short of claims, at 80 dB, while i.f. rejection measured exactly 75 dB, as claimed.

Figure 4 depicts stereo separation and mono and stereo distortion versus frequency for the R-350. We were, frankly, amazed at the ability of this particular IC circuit to maintain excellent separation over the entire audio spectrum. While mid-band separation measured 34 dB, a bit short of the 35 dB claimed, of far greater importance is the fact that separation in excess of 30 dB is maintained all the way from 50 Hz to 15 kHz—a very rare accomplishment in stereo tuner sections! The three key separation figures for 100 Hz, 1 kHz and 10 kHz were 34 dB, 34 dB and 33 dB respectively. Distortion in mono measured 0.55%, 0.4% and 0.6% at 100 Hz, 1 kHz and 7.5 kHz respectively, while in stereo the key frequencies of 100 Hz, 1 kHz and 5 kHz resulted in distortion figures of 0.85%, 0.8% and 0.8% respectively, with no significant evidence of "beats" at the higher frequencies measured.

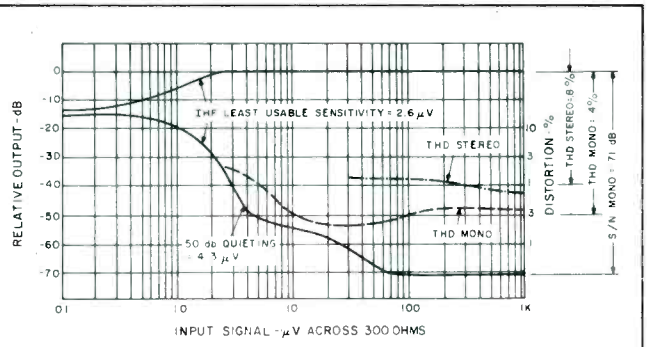


Fig. 3—Quieting and mid-band THD characteristics.

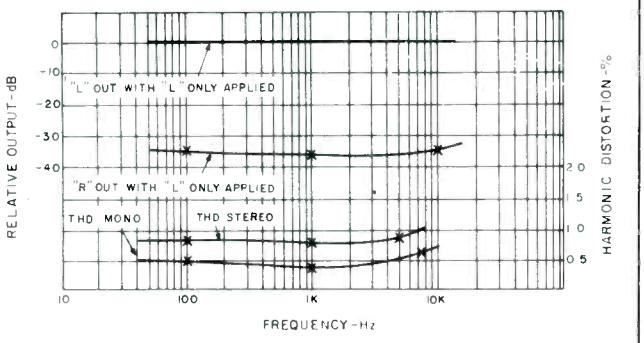


Fig. 4—Separation and distortion vs. frequency.

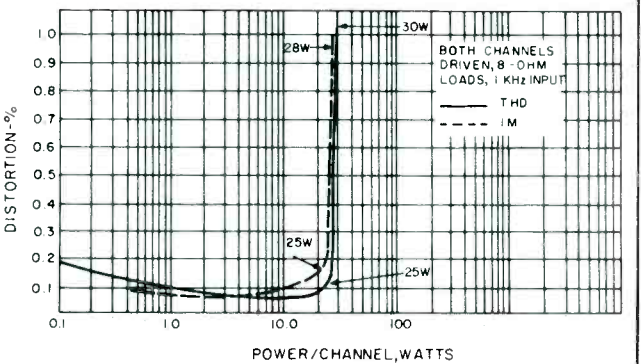


Fig. 5—Mid-band power output vs. distortion.

Amplifier Measurements

Amplifier performance of the R-350 is somewhat conservatively stated by the manufacturer, too. Rated THD of 1.0% was attained with 30 watts per channel output, as shown in Fig. 5. At rated output of 25 watts per channel, THD measured a mere 0.1% while IM measured 0.2%. Rated IM was not reached until each amplifier channel was putting out 28 watts. While THD tended to rise slightly at low listening levels, it remained well below the low-power claim of 0.5% even down to 0.1 watts output per channel. The amplifier section is not quite capable of 25 watts per channel output at the low frequency 20 Hz test point, as shown in Fig. 6, but of course no claims for such performance are made by the manufacturer who quotes only mid-frequency performance in accordance with IHF current standards. At half-power, however, distortion remains well below 0.5% for all audio frequencies. Power bandwidth, as shown in Fig. 7, extends from 15 Hz all the way to 48 kHz as against the 40 kHz claimed by the manufacturer, and measurements of

this characteristic were based upon Superscope's nominal 25 watt rating and a THD of 1.0%.

Quadraphase Speaker Connections

The R-350 is equipped with an extra pair of speaker connection terminals on the rear panel which they call Quadraphase. An extra pair of speakers connected to these terminals and placed at the rear of the listening room will provide the listener with a quasi four-channel effect not unlike that obtained with the familiar Dynaquad circuit promoted by Dynaco during the early flurry of four-channel activity which preceded more conventional four-channel technology as we know it today. It is to Superscope's credit that at no point in their instruction manual or in their advertising material do they imply that this arrangement provides "real" four-channel reproduction. In fact, they are careful to state clearly that "The Quadraphase position on the selector switch simulates four-channel sound from regular stereo sources when two additional speakers are connected to the rear panel Quadraphase outputs." If you own two extra speakers and hook them up in this way, you may get a "poor man's introduction to quadraphonic sound" and we cannot fault Superscope for this feature, particularly since it does not add materially to the cost of the set. Since the R-350 is equipped with a proper set of tape monitor input and output jacks, there is nothing to prevent you from adding a four-channel decoder (or a CD-4 demodulator) and an extra back-channel amplifier at a later date if you want to convert the R-350 to true quadraphonic capability and that is all to the good.

Figure 8 shows the tone control, filter and loudness control characteristics of the R-350 and the various responses conform nicely with accepted practice for these controls. Bass and treble controls affect both left and right channels at the turn of a single knob in each case.

Phono hum was acceptably low at -62 dB with respect to a 2.5 mV input signal at 1 kHz required to produce full power output. High level input requirements were 160 mV and, with this reference signal, residual hum and noise was 70 dB as claimed. At minimum volume setting, residual hum and noise measured -80 dB. Volume control tracking for both channels was accurate within 1 dB all the way down to -60 dB from full volume setting. Phono overload occurred at an input of about 80 mV which, in theory, would yield a dynamic range of about 88 dB were it not for the lower noise limitations imposed by the phono preamplifier characteristics.

Listening Tests

We put the R-350 through its paces in both the FM and Phono modes and found the performance generally as good as that of receivers selling for as much as $100.00 higher. As mentioned earlier, the high muting threshold interfered with our ability to "log" the usual high number of FM signals when that feature was employed. Specifically, using an outdoor directional antenna, we logged 45 usable signals with the muting feature not activated. This dropped to 30 signals when muting was employed. Stereo was received from 20 signals, though we know that another 8 or so were, in fact, transmitting stereo programming at the time of our tests. This discrepancy results from the high stereo threshold set for this model. While only a single peak-reading meter is employed, it is accurately calibrated and helps to tune to center of channel—though not as effectively as a center-channel meter might do. Record reproduction was crisp and noise-free at our preferred listening levels (about 90 dB), and we used both high-efficiency and moderately low-efficiency air suspension systems in our tests. With two pairs of low efficiency systems connected and used simultaneously (not for "quadraphase," but for multi-room installations), there were still adequate sound levels achieved with barely audible distortion on really loud peaks. If higher efficiency speakers had been used in this arrangement, there would have been power to spare.

Summary

The Superscope R-350 is a reasonably priced stereo receiver that meets just about all its claims and should rank high in the list of "under $300" receivers that constitute such an important place in the audio component market. It is easy to use and, though it lacks perhaps the last measure of circuit sophistication, design, construction and performance are all honest. The three-year warranty offered by Superscope for this and its other new products should not be overlooked either. This warranty applies to all parts used in the receiver.

Leonard Feldman

Check No. 54 on Reader Service Card

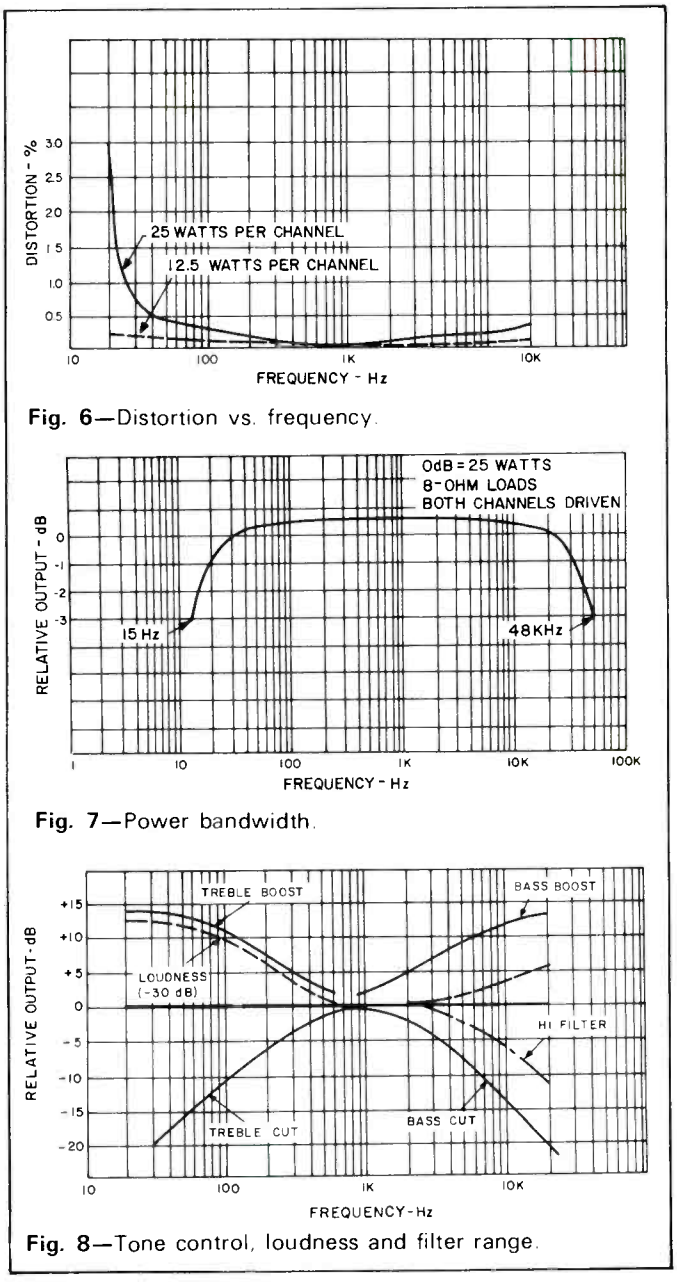


Fig. 6—Distortion vs. frequency.

Fig. 7—Power bandwidth.

Fig. 8—Tone control, loudness and filter range.