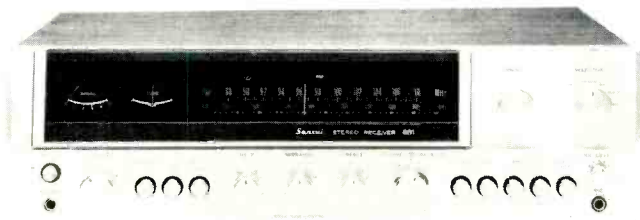


## Sansui 881 Stereo Receiver



### MANUFACTURER'S SPECIFICATIONS

#### FM Tuner Section

**IHF Sensitivity:** 1.9  $\mu$ V. **Selectivity:** 70 dB. **S/N Ratio:** 70 dB. **Capture Ratio:** 1.5 dB. **I.F. Rejection:** 90 dB. **Image Rejection:** 75 dB. **Spurious Response Rejection:** 80 dB. **Frequency Response:** 30 to 15,000 Hz +0.5dB -3.0dB. **Stereo Separation:** 40 dB @ 1 kHz. **THD:** Mono, 0.3%; Stereo, 0.5%.

#### AM Tuner Section

**Sensitivity:** 53 dB/meter (internal antenna). **Selectivity:** 30 dB. **I.F. Rejection:** 80 dB/meter. **Image Rejection:** 80 dB/meter.

#### Amplifier Section

**Power Output:** 60 watts continuous power per channel, 8 ohm loads, 20 to 20,000 Hz. **Maximum THD:** 0.3%. **IM Dis-**

**tortion:** 0.3%. **Frequency Response:** 10 to 30,000 Hz,  $\pm 1$  dB. **RIAA Phono Equalization:** 30 Hz to 15,000 Hz,  $\pm 1$  dB. **Damping Factor:** 8 ohms, 45. **Input Sensitivity:** Phono, 2.5 mV; Mike, 2.5 mV; AUX, tape, 100 mV. **Maximum Input Capability:** Phono, 200 mV. **Hum and Noise:** Phono, 70 dB (IHF); AUX, 80 dB (IHF). **Bass Control:**  $\pm 10$  dB @ 50 Hz. **Midrange Control:**  $\pm 5$  dB @ 1.5 kHz. **Treble Control:**  $\pm 10$  dB @ 10 kHz. **High Filter:** -10 dB @ 10 kHz. **Low Filter:** -10 dB @ 50 Hz.

#### General Specifications

**Power Consumption:** 160 watts at 117 V a.c., 50/60 Hz. **Dimensions:** 19 in. W x 5  $\frac{5}{16}$  in. H x 11  $\frac{3}{4}$  in. D. **Weight:** 29 lbs. **Price:** \$529.95

Modern stereo receivers today rival the separate amplifier and tuner both in flexibility and performance capability. The most recent example tested in our laboratories is Sansui's Model 881, a trim-looking component housing enough control features to delight the most seasoned knob-twirler or switch thrower. No larger than receivers offering a fraction of its power output capability just a few years ago, the 881 has a rich, gold anodized, three-dimensional front panel with a framed, blacked-out dial area occupying more than two thirds of the panel length. Illumination is soft green for the linearly calibrated FM frequency scale, the twin tuning meters (signal strength and center channel), and the AM frequency scale. The logging scale and program source indicators light up in bright orange, while the stereo FM indicator lights up in red when a stereo signal is re-

ceived. To the right of the dial area are a good-sized tuning knob and a rotary, five-position program selector switch.

Rotary controls, located along the bottom section of the panel, include a *Speaker selector switch* (whose most counterclockwise setting turns off all speakers), *Bass*, *Midrange* and *Treble* controls, a tandem *Volume* and *Balance* control, and a *Mike Level* control at the extreme right, just above the *Mike* input jack. Since up to three pairs of speakers can be connected to the 881, the speaker switch can select any pair, as well as combinations of two pairs (main, plus either of the remotes). To preclude loading the amplifiers with dangerously low impedances, there is no setting provided for operating all three sets of speakers at once.

Push buttons are used for *Power On/Off*, *Audio Muting* (a fixed 20-dB level reduction), *High* and *Low cut Filters*, *Loudness compensation*, *Mono/Stereo* switching, two *Tape Monitor* circuits, and *FM interstation noise Muting*. A *Stereo Phone* jack is located just below the *Power On/Off* switch at the lower left end of the panel.

The rear panel, pictured in Fig. 1, has 300-ohm and external AM antenna terminals plus a coaxial connector and retaining cable clamp for 75-ohm shielded antenna cable. *Auxiliary*, *Phono* and *Tape Rec and Play* jacks for the two monitoring circuits are clustered under the antenna terminals, along with a DIN connector for one of the tape monitoring circuits and a convenient ground terminal for a turntable. Two sets of *AUX* inputs are provided. There is a pivotable AM ferrite-bar antenna at the center of the rear panel, just above the large, finned, power transistor heat sinks. Switched and unswitched a.c. power outlets, an a.c. power fuse, and three sets of spring-return piano-key speaker terminals are all located at the opposite end of the panel, far from the low-level inputs.

A view of the internal chassis layout of the receiver is shown in Fig. 2. The massive power transformer in the corner supplies positive and negative voltages of 45 V d.c.,

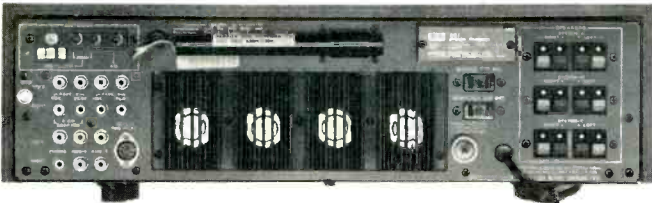


Fig. 1—Rear panel of the 881.

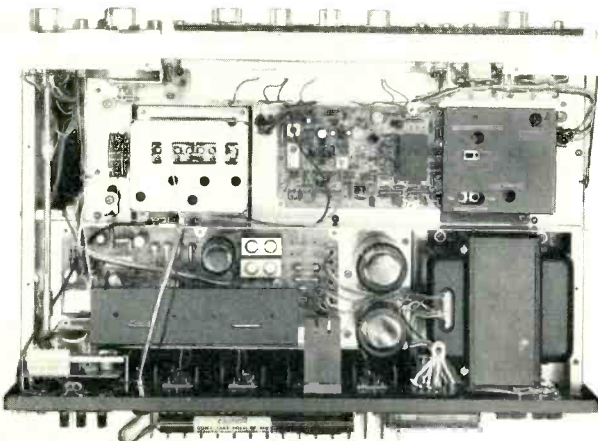


Fig. 2—Internal view.

each filtered by 10,000  $\mu$ F capacitors, as well as the lower voltages required by circuits other than the power output stages, most of which are regulated by an elaborate transistorized and zener controlled power supply module. A relay delays turn-on for a few seconds and is also used in the protection circuitry of the receiver.

Power amplifier sections are direct coupled from input to output, with a differential amplifier first stage in each channel. Identical ICs are used in the tone control, microphone and phono preamplifier circuits, preceded by a low noise NPN transistor in the case of the mike preamp. ICs are also used in the tuner section for multiplex decoding and in three of the six i.f. and limiter stages of the FM section. Two dual-element ceramic filters driving differential amplifier i.f.-stage pairs and a conventional ratio-detector are used in the FM i.f. section. A single multi-circuit IC is used for the AM i.f. circuit.

The entire layout is neat and orderly and most interwiring between circuit modules is accomplished with multiple conductor connectors, making for ease of servicing and removal of any module.

### FM Tuner Section Measurements

Curves plotted in Fig. 3 show some of the FM performance characteristics of the Sansui 881. IHF sensitivity measured 1.8  $\mu$ V, a bit better than the 1.9 claimed. The quieting slope for mono reception is extremely steep, reaching 50 dB with only 2.5 microvolts of signal applied. THD in mono reaches 0.5% with only 3  $\mu$ V, decreasing to a very low 0.2% for stronger signals. Ultimate quieting in mono reaches 70 dB, as specified. Sansui arranged their automatic mono-stereo switching so that it operates in the vicinity of 40  $\mu$ V, therefore we couldn't measure absolute stereo sensitivity. By the time a signal is strong enough to switch the set to stereo reception, stereo quieting is already 54 dB and THD is down to 0.64%. This action will prevent some users from receiving signals weaker than 40  $\mu$ V in stereo. (Editor's Note: Sansui tells us that later production models have the automatic mono-stereo switching adjusted to the 20 to 25  $\mu$ V range, and that Sansui dealers will adjust any unit which is not performing satisfactorily free of charge.)

For high signal strengths, best stereo S/N ratio measured -67 dB while THD decreased to 0.47%, a bit better than claimed. Alternate channel selectivity was measured at 72 dB. Image and spurious rejection were minus 75 and minus 85 dB respectively, while capture ratio on our sample measured 1.3 dB, again just a bit better than that listed by Sansui. We found the muting threshold internally set at too high a level, 45 microvolts, when you consider that even with a mere 10 microvolts, 60 dB quieting is obtained in mono. The muting threshold could have been set at this lower value, enabling users to have quiet interstation tuning, while still being able to receive weaker signals.

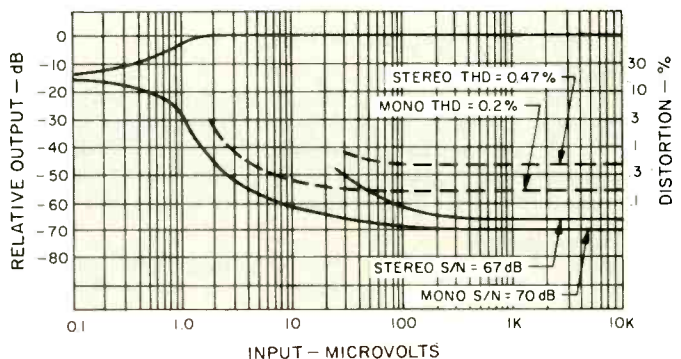


Fig. 3—FM quieting and distortion characteristics.



Stereo separation, plotted in Fig. 4, measured 40 dB at mid-frequencies, decreasing to 30 dB at 10 kHz and around 35 dB at 50 Hz—excellent figures all. Distortion at frequencies other than 1,000 Hz is also plotted in Fig. 4 and remains around 0.25 percent from 50 Hz to 10 kHz in mono. In stereo there is a small rise in THD at low frequencies to 1.3% at 50 Hz and at 10 kHz. The high frequency non-fundamental sig-

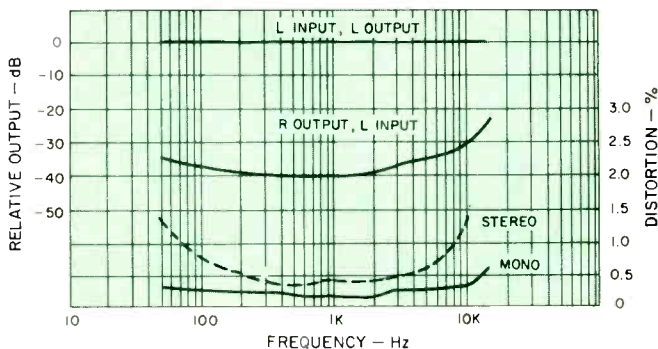


Fig. 4—FM separation and distortion versus frequency.

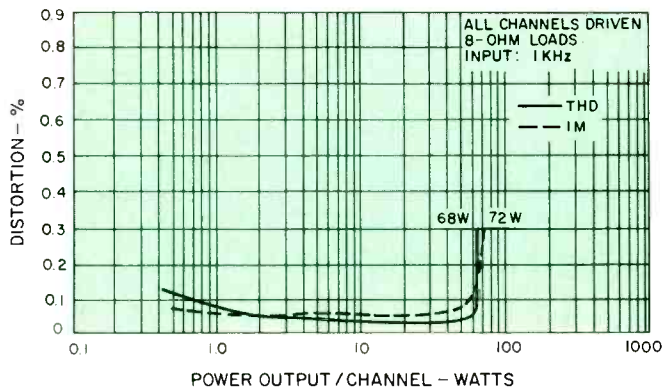


Fig. 5—Harmonic and intermodulation distortion characteristics.

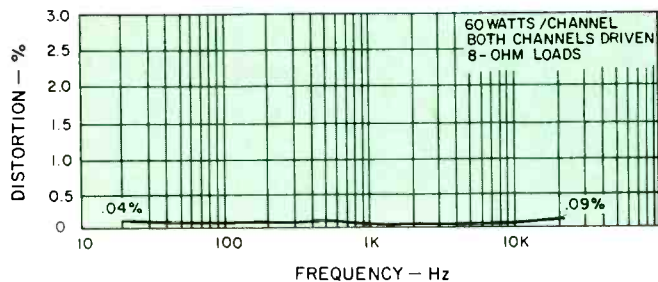


Fig. 6—Distortion versus frequency.

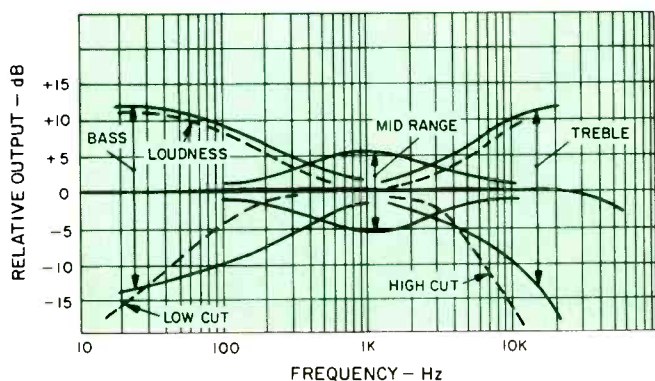


Fig. 7—Tone-control range, and filter and loudness circuit characteristics.

nal content is primarily low amplitude beats rather than actual harmonic distortion.

The AM sensitivity specification listed by Sansui is not a standard method of specifying AM performance, but if it is intended to mean 53 dB below 1 volt, that would be more than 2000 microvolts/meter. Actually the AM section measured about 250 microvolts/meter using the internal bar antenna, and about 50 microvolts sensitivity referred to the external antenna terminal and using a standard dummy antenna. This is about average for a two-gang tuning AM system such as that used here, and is adequate for most local reception.

### Amplifier Measurements

At mid frequencies, the amplifier sections of the Model 881 produce rated output per channel (60 watts) with a mere 0.044% total harmonic distortion. Of course, this power specification now relates (in accordance with new FTC rules) to all frequencies from 20 Hz to 20,000 Hz, but we still find it informative to check power output capability at mid frequencies. In this case, 68 watts was produced at 1 kHz before THD reached the rated level of 0.3%, as shown in Fig. 5. IM distortion remains well under 0.1% for all power levels below 60 watts and reaches rated 0.3% at 72 watts per channel, all measured with both channels driven and into 8-ohm resistive loads. It should be noted that all power output tests were conducted *after* the receiver had been subjected to the required one hour of preconditioning at one-third rated power output delivered by each channel. No thermal cut-out took place during this prolonged test, and in fact, heat sink temperatures were surprisingly low at the conclusion of this test. Even in terms of its stated full power bandwidth, the Sansui 881 is very conservatively rated, as can be seen from Fig. 6. At the 20 Hz and 20 kHz frequency extremes, the receiver delivered its rated 60 watts per channel with 0.04% and 0.09% THD respectively far below the nominal rated THD, 0.3%. Obviously, Sansui has no desire to tangle with the FTC, and we consumers can only benefit from such conservative design.

We measured RIAA equalization and found it within 1.0 dB from 30 Hz to 15 kHz, as stated. Tone control action, filter action, and loudness compensation at -30 dB are all plotted in Fig. 7. We feel that high-end compensation of the loudness circuit had too much emphasis, and preferred to do our listening, even at low levels, without the aid of this circuit, adjusting tone controls to suit our taste instead. Phono overload was an excellent 250 millivolts, fully 40 dB above nominal input sensitivity. The importance of this high overload capability has not been sufficiently emphasized in the literature, since it determines to a large extent the dynamic range which can be reproduced from records without audible distortion, independent of the output capacity of the power amplifier sections.

Hum and noise in phono was -64 dB (unweighted), which translates to -72 dB when using the "A" weighting curve. Residual hum and noise for the high level (AUX and Tape) inputs measured -82 dB, unweighted, while residual hum at minimum volume was a low 86 dB below full output level.

Amplifier and preamplifier sections performed flawlessly, providing extremely clean sound at all listening levels to our low-efficiency test speakers. Control action is good, with volume control audio taper just the way we like it. Tone controls have click-stop settings, as does the balance control at its mid-point. All front panel controls are smooth operating and each performs a useful function. The double tape monitoring facilities were used for dubbing from tape to tape with ease and are nice to have even if one tape deck is used, what with so many accessory items, such as 4-channel adaptors and noise reduction devices, available today which connect at tape monitor jacks.

FM reception was clean, drift-free and consistent with the other performance qualities of this powerful receiver. Calibration was perfect for both AM and FM and the center-of-

channel meter corresponded perfectly with lowest distortion tuning point across the entire dial. Our criticism above of stereo threshold and muting threshold setting was reinforced during listening tests, for we lost some dozen stations that were acceptable from a noise and quality standpoint. Similarly, three stations known to be broadcasting in stereo were received only in mono because of the high stereo threshold.

We have always felt that the addition of a mid-range tone control is welcome in any system, since it affords the listener an extra degree of tone adjustment, which often can bring life to an otherwise dull recording or other program

source. In the past we have objected to the availability of too much "presence" boost, and we feel Sansui has wisely restricted the mid-range action to  $\pm 5$  dB—just enough to do the job properly.

In summary, the Sansui Model 881 stereo receiver offers high power output at extremely low distortion, all the control features most listeners are likely to ever want, plus the convenience of high-quality stereo FM reception in a single, attractive package. All of this at a price of less than \$500.00 makes the 881 an excellent choice as the electronic component of a top-grade stereo high fidelity system.

*Leonard Feldman*