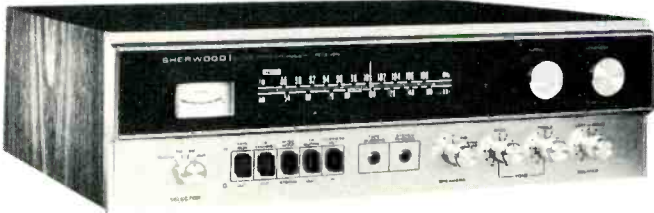


Equipment Profiles

Sherwood S-7210 Stereo Receiver



MANUFACTURER'S SPECIFICATIONS

FM Tuner Section

IHF Sensitivity: 1.9 μ V. **Selectivity:** 65 dB. **Capture Ratio:** 1.4 dB. **Signal-to-Noise Ratio:** 68 dB. **AM Suppression:** 60 dB. **THD:** Mono, 0.3%; Stereo, 0.6%. **Image Rejection:** 70 dB. **IF Rejection:** 85 dB. **Spurious Rejection:** 90 dB. **Stereo Threshold:** 5 μ V. **Stereo Separation:** 1 kHz, 40 dB.

AM Tuner Section

IHF Sensitivity: 20 μ V. **Selectivity:** 30 dB. **Image Rejection:** 40 dB. **IF Rejection:** 40 dB.

Amplifier Section

Power Output: 28 watts/channel, 8 ohm loads, 40 Hz to 20,000 Hz. **Rated Harmonic Distortion:** 0.7%. **IM Distortion:** 0.8% at rated output. **Frequency Response:** Phono, RIAA \pm 1.5 dB; AUX, 20 Hz to 20 kHz \pm 0.5 dB. **Damping Factor:** 30. **Input Sensitivity:** Phono, 2.0 mV; AUX, 220 mV. **Phono Overload:** 100 mV. **Bass Control:** \pm 12 dB at 50 Hz. **Treble Control:** \pm 12 dB at 15 kHz.

General Specifications

Power Requirements: 115/125 V, 50/60 Hz, 180 watts maximum. **Dimensions:** 17 1/2 in. W. x 5 1/4 in. H. x 13 1/4 D. **Weight:** 27 lbs. **Price:** \$299.95.

Sherwood Laboratories has, over the years, offered a consistently good line of products at reasonable prices, and in these days of rising costs, it's nice to find in the just-under-\$300 price range a high quality receiver that omits a few of the extra frills and still offers good basic performance and doesn't skimp on power output capability. One can almost see Sherwood's management and engineering people getting together to set the price target, then proceeding to design everything into this receiver which could possibly be included at that price without losing money.

The wood enclosure and three-dimensional, extruded front panel certainly suggest more expensive components. A full-width, blacked-out dial illuminates when power is applied disclosing a linear FM dial scale, a well-calibrated AM scale, and a 0-100 reference (logging) scale. A peak-reading signal-strength meter, which works for both FM and AM, is



Fig. 1 — Rear view.

at the left, while at the right are a flywheel-coupled tuning knob and the master volume control (calibrated in dB), which also serves as a power on/off switch. Rotary controls along the lower section of the panel include a *Program* selector switch, *Speaker* selector switch, *Bass* and *Treble* tone controls, and a *Balance* control. Black, rectangular, push-button switches handle *Tape* monitoring, *Mono/Stereo* selection, *FM Muting*, and *Loudness* control activation. There are actually two tape monitor circuits, with the second identified as *4-channel Adaptor*, since the addition of such an adaptor requires a circuit interruption point which is identical to the usual *Tape Out* and *Tape in* jacks associated with tape monitoring. Tape dubbing and stereo headphone jacks are located at the center of the panel's lower section. The tape dubbing jack permits connection of a second tape deck for copying tapes with the first deck connected via the rear panel tape jacks.

The rear panel, pictured in Fig. 1, contains screw terminals for connection of main and remote speaker pairs. Alternatively, all four speaker systems can be set up in the same listening room and the speaker switch set to the *Dynaquad* position, which causes out-of-phase, ambient information (often contained in stereo or matrix 4-channel discs) to be fed to the rear speakers in a simulation 4-channel sound. The standard 300-ohm, 75-ohm, and AM antenna lines can be connected to screw terminals located just under the pivotable AM ferrite bar antenna. Standard phono-tip jacks are provided for *Phono*, *AUX* and *Tape Inputs* (including the second 4-channel adaptor pair) and *Tape* (or adaptor) *Outputs*. There is also a single FM 4-channel output jack, which delivers the composite detected FM signal for future use with suitable FM 4-channel adaptors.

A pair of speaker fuses are housed under a plastic cover held in place by a single screw. The see-through cover permits inspection of the fuses to see whether one is blown before removing the cover. A power line fuse, mounted in a standard fuseholder, and a single switched a.c. receptacle

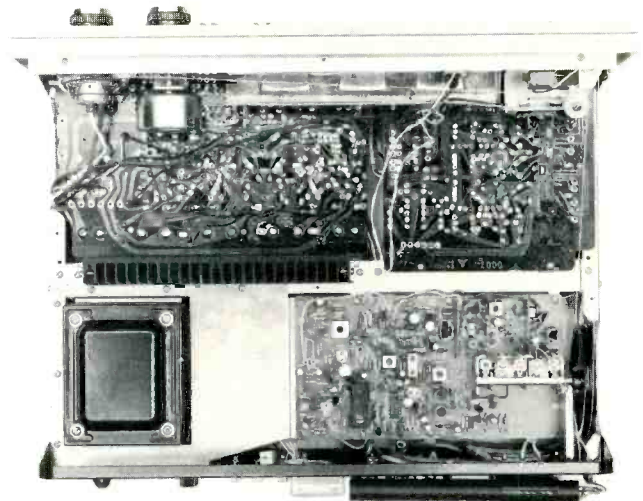


Fig. 2 — Inside view of receiver.

complete the rear panel layout. No separate ground terminal for record changers is provided and users are instructed to use the ground terminal of the 75-ohm antenna pair for this purpose.

We examined the internal construction and layout of the receiver (See Fig. 2) and found it to be cleanly laid out and ruggedly assembled. Power transformer and heat sinks seemed thoroughly adequate judging from the power output range of this model.

FM Tuner Measurements

IHF sensitivity in mono FM was a low $1.7 \mu\text{V}$, measurably better than the $1.9 \mu\text{V}$ claimed by the manufacturer. Only $2.5 \mu\text{V}$ of signal was required to produce 50 dB of quieting — an impressive figure for such a low-priced receiver. Ultimate signal-to-noise ratio (measured at a signal input of $1000 \mu\text{V}$) was exactly 68 dB, as claimed, for mono reception. In the stereo mode, best S/N ratio was 60 dB, and switching from mono to stereo occurred at $18 \mu\text{V}$ of signal input, by which time the signal-to-noise ratio had already reached 43 dB. A bit more than $30 \mu\text{V}$ of signal was required to achieve a 50 dB S/N ratio in stereo.

Distortion in mono was a low 0.25% at 1 kHz, and measured even lower, 0.19%, at 400 Hz. In stereo, 0.3% THD was observed for mid-frequencies. These results are shown graphically in Fig. 3. Capture ratio measured 1.4 dB, as specified, at a signal input strength of $100 \mu\text{V}$, improving somewhat with higher signal strengths. Selectivity measured 67 dB, while spurious and i.f. rejection were both about 90 dB. Frequency response of FM was flat from 50 Hz to 15 kHz within 1.0 dB.

Measured sensitivity of the AM section was $18 \mu\text{V}$, while image and i.f. rejection both measured 40 dB as claimed. Distortion in AM (for 30% modulation) measured 1.3%, and frequency response was down 6 dB at 3.5 kHz.

Figure 4 is a plot of stereo FM separation and distortion at various audio frequencies. Separation at mid-frequencies was 40 dB as claimed, decreasing to 25 dB at 100 Hz and 26 dB at 10 kHz. Mono THD was 0.5% or lower from 100 Hz to 14 kHz. In stereo, low frequency THD remained well under 1.0%, increasing at high frequencies due to the appearance of non-harmonically related beats between audio signals and residual carrier products.

Amplifier Measurements

Several power output ratings are listed in the owner's manual for the Sherwood S-7210. The one which complies most closely with FTC regulations specifies 28 watts per channel over the frequency range from 40 Hz to 20 kHz at maximum rated distortion of 0.7%, when driving 8-ohm loads. (If one wishes to rate the unit from 20 Hz to 20 kHz, Sherwood offers a 26 watt per channel rating.) Whichever you choose, the sample tested did better, delivering 33 watts at mid-frequencies for rated distortion, and 27.5 watts at 20 Hz into 8-ohm loads. At mid-frequencies and power levels below maximum output, THD drops quickly to just under 0.1%, measuring 0.08% at 28 watts per channel output. IM distortion is also under 0.1% for power levels from maximum down to about 3 watts, below which IM rises slightly

Erratum

In our June Profile of the Yamaha YP-701 turntable, we printed an erroneous (high) figure for the test unit's flutter. Actual measured flutter was only 0.04%, which is (as was stated in the review) excellent. Our apologies to Yamaha, and to those of our readers who may have been momentarily confused by the typographical error.—Ed.

to a maximum of 0.2%. These measured results are shown in Fig. 5.

Distortion at rated output for all frequencies is plotted in Fig. 6. At 20 kHz, the receiver delivered 28 watts per channel at 0.15% distortion; 0.2% THD was observed for this output level at 50 Hz.

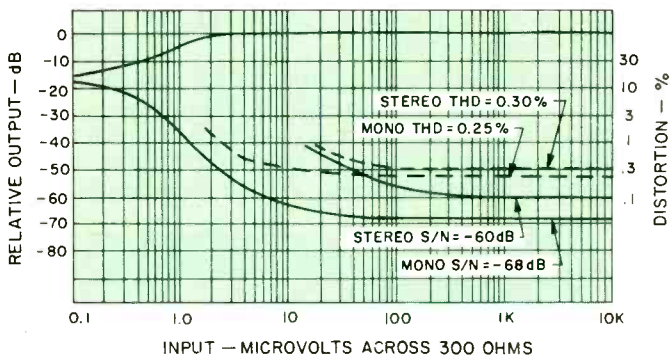


Fig. 3 — FM quieting and distortion characteristics.

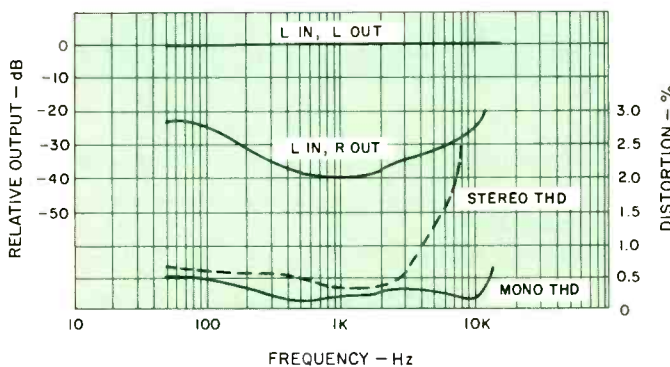


Fig. 4 — Separation and distortion vs. frequency.

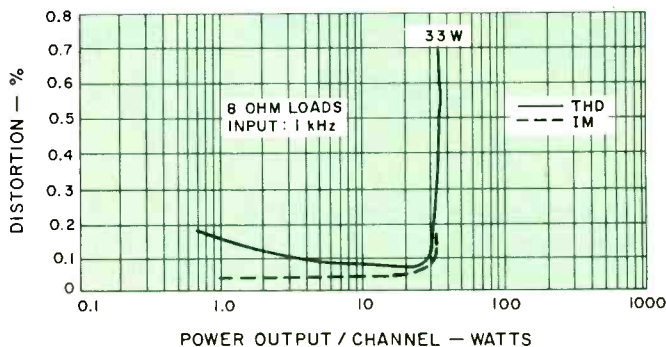


Fig. 5 — Harmonic and intermodulation distortion.

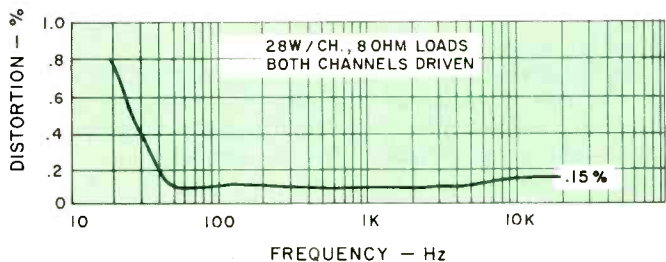


Fig. 6 — Distortion versus frequency.

Preamplifier Section Measurements

Frequency response measured from the AUX inputs through the entire preamp/amplifier circuitry was flat from 6 Hz to 30 kHz within ± 1 dB, while the -3 dB roll-off points occurred at 4 Hz and 60 kHz. Tone control and loudness compensation characteristics are shown in Fig. 7. Phono in/out sensitivity measured 2.2 mV. Overload margin was far better than claimed, with an input of 135 mV required to produce first-stage distortion.

Hum and noise measured through the phono inputs was as low as we have ever measured, -71 dB unweighted, referencing full output and rated input sensitivity. Even though this is an unweighted figure, it exceeds the claimed -65 dB published by the manufacturer. High level inputs have sig-

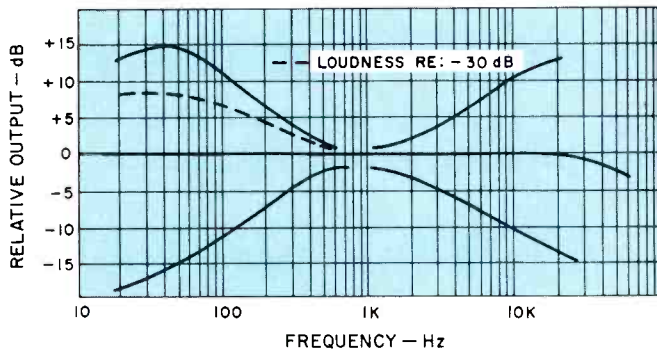
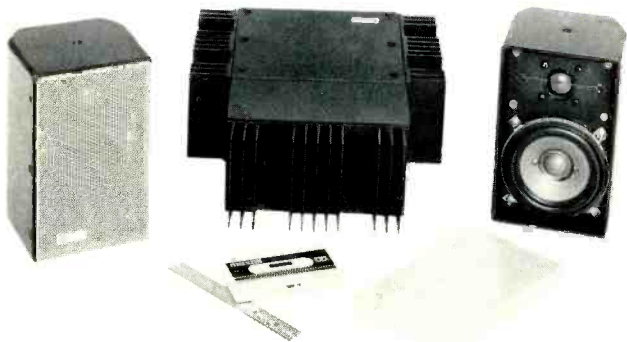


Fig. 7 — Tone control range and loudness compensation.

ADS Model 2001 Car Speaker System



MANUFACTURER'S SPECIFICATIONS

System Type: Bi-amplified, acoustic suspension stereo speaker system. **Frequency Response:** 50 to 25,000 Hz, @ DIN 45-500. **Woofer:** 4-in. long excursion cone. **Tweeter:** 1-in. low-mass soft dome. **Speaker Dimensions:** 6-7/8 in. H. x 4 1/4 in. W. x 4 in. D. **Speaker Weight:** 4 lbs.

Power Amplifiers

Woofer Amplifiers: 2 x 60 W at 500 Hz. **Tweeter Amplifiers:** 2 x 20 W at 10 kHz. **Dimensions:** 3-5/8 in. H x 9-3/8 in. W. x 6 1/2 in. D.

Signal Processor

Input Sensitivity: Low level, 0.5 V into 43k ohms; high level, 5 V into 350k ohms; active filter electronic crossover; equalization for extended bass, and built-in opto-electronic LED limiter for high amplitudes at low frequencies.

Power Supply

Input Voltage: 11 to 16 V d.c. D.c. to d.c. switching converter. **Standby Current at 12 V:** 0.75 A. **Maximum Current:** 26 A. **Dimensions:** 3-5/8 in. H. x 6 1/2 in. W. x 3 1/2 in. D.

System Price: \$475.00

nal-to-hum ratio of 85 dB, also better than the 80 dB claimed, though no further reduction in residual hum level is observed when decreasing the volume control to its minimum setting.

Listening Tests

Sherwood has done a good job of balancing power output and price in this receiver. We were impressed with the unit's ability to drive medium-low efficiency speakers to room-filling loudness levels and suspect that the absence of frills such as filters and more switching were traded off to let dealers sell this unit at the popular "under \$300.00" price.

When we played Columbia's new release of *Carmina Burana*, which is loaded with strong percussive transients and wide swings of dynamic range, the set exhibited none of the input overload characteristics which too often show up in low-cost receivers.

Checking out the FM section, we would have preferred a lower threshold for stereo switching and suspect that Sherwood may have misadjusted this particular sample. Printed specifications claim a stereo switching threshold of 5 μ V, which would have been quite acceptable. Muting also seemed set a bit too high, having an input signal threshold of 18 microvolts. Tuning weak stations without using the muting circuitry gave generally acceptable program sources.

If ever proof were needed that high fidelity components offer more value-per-dollar today than they did even five years ago, inflation notwithstanding, Sherwood proves the point convincingly with its S-7210.

Leonard Feldman.

Check No. 82 on Reader Service Card

Have you ever wished you could turn on your car radio and really hear good, high quality sound? Not the sound of a six-in. whizzer cone special speaker that buzzes like an angry hornet on those inaudible bass notes it is vainly trying to reproduce. Nor the equally anemic high frequency response that seems to lose all of the strings in the orchestra. But a real, honest-to-goodness, high quality sound?

Well, the new mobile speaker system made by ADS in Cambridge, Mass., may well be the answer to your dream of not being forced to leave good music reproduction behind in your living room when you go on a trip. The ADS 2001 is a new miniature, bi-amplified stereo speaker system designed to be powered from 12 volts d.c. and intended for use in cars, boats, vans, campers, etc.

This system comes complete with a combined power amplifier and power supply module, and two deceptively small speaker enclosures. The power supply and amplifier are in a single squat package measuring 12 x 9 1/2 x 4 in. (30.5 x 24 x 10 cm). With the heat sink fins protruding from three sides and a flat black color, the amplifier probably won't win any beauty contests. But it doesn't have to look pretty. It is intended to be tucked away in a trunk space or any compartment where it can go about its job with a minimal amount of free-air passage. There is a treble trim pot inside the module, which requires removal of the cover for adjustment. A labelled hole would have made this easier and perhaps safer.

The speakers are housed in even smaller enclosures measuring about 7 x 4 1/2 x 4 in. (18 x 11.5 x 10 cm). Protected by metal on all sides, including the perforated grille, the speakers are supplied with 9 ft. (2.7 meters) of cable for connection to the amplifier output.

The amplifier unit actually contains four power amplifiers and their associated preamplifiers plus a d.c.-to-d.c. switching converter for changing the 12 V battery voltage to the higher voltage needed by the power amplifiers. The units

(Continued on page 43)