Equipment Profiles

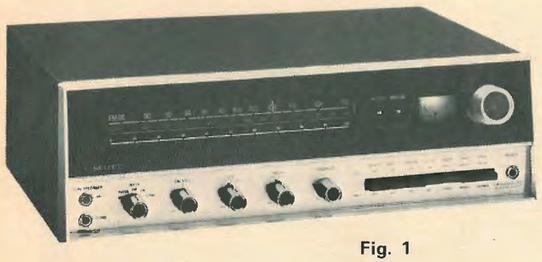

Fig. 1

Scott Model 387 AM/FM Stereo Receiver

MANUFACTURER'S SPECIFICATIONS

FM Tuner Section. IHF Sensitivity: 1.9 μV. **THD Mono:** 0.6%. **THD Stereo:** 0.8%. **S/N:** 65 dB. **Capture Ratio:** 2.5 dB. **Cross-Modulation Rejection:** 80 dB. **Selectivity:** 42 dB. **Stereo Separation:** 40 dB.

AM Tuner Section. IHF Sensitivity: 4 μV @ 600 kHz. **IHF Selectivity:** 32 dB.

Amplifier Section. Continuous power (rms), both channels driven: 85 watts/channel @ 4 ohms, 55 watts/channel @ 8 ohms. **THD:** 0.5% at rated output. **IHF Power Bandwidth:** 10 Hz to 38 kHz. **Phono input sensitivity:** 4.2 mV or 8.5 mV. **IM:** 0.5% at rated power output. **Hum and noise, Phono:** -70 dB (ref. 4.2 mV input):

Dimensions: 17½ in. W × 5¾ in. H × 14¾ in. D. **Retail Price:** $449.95.

Pegged at just $100.00 below H. H. Scott's "top of the line" Model 3900 receiver, this Model 387 is such an *excellent* product that we would, frankly, be interested to see just how much more quality and performance could be built in for another $100.00. As with so many H. H. Scott products, the FM tuner performance leaves little to be desired—it is truly "state of the art." The amplifier section, a real powerhouse at 85 watts per channel (4 ohm loads), meets just about all of its specs.

The Model 387 has the upper portion of the panel "blacked out" by means of a section of tinted plastic until power is applied to the unit, at which time the dial scale becomes brightly illuminated in red, green, and pale green for logging scale, AM scale and FM scale respectively. The logging scale is more decorative than useful, since it is calibrated in units of ten from zero to one hundred. The FM scale, on the other hand, is calibrated accurately at every megahertz. Adjacent to the dial scale are a series of illuminated words denoting the setting of the selector switch, as well as the Perfectune indicator which we shall discuss shortly. Finally, the upper portion of the panel contains a peak-reading tuning meter and a large tuning knob coupled to an effective flywheel. The lower portion of the panel is finished in gold and includes controls for INPUT selection, BALANCE, BASS (dual concentric control for separate adjustment of left and right channel), TREBLE (also a dual control), LOUDNESS (which, in its furthest counterclockwise setting turns off power to the set), and a series of seven push buttons of the push-to-make, push-to-break type. The pushbuttons activate either of two sets of speakers, turn the FM muting circuits on and off, activate the high frequency cut filter, switch from mono to stereo, provide a tape monitor switch, and introduce or defeat the loudness compensation action. A stereo headphone jack at the lower right and a pair of tape recorder input and output jacks (parallelling those on the rear panel) completes the front panel layout.

The rear panel contains several novel features in addition to the usual input and output jacks. While antenna inputs for 300-ohm and 75-ohm transmission lines are not unique, this is the first time we have seen a proper coaxial connector supplied for the 75-ohm alternative. A switch selects either impedance. The loopstick antenna is supplied separately, equipped with a special connector plug and a mounting bracket. This is a welcome packaging innovation, since the normally protruding AM loopstick is often subjected to mishandling in shipment. The power line cord is also separately packed and connects to a matching receptacle at the lower left corner of the rear panel. An a.c. convenience outlet, a line fuse, and two speaker fuses as well as a terminal strip (with removable jumper) for external AM antenna are also located in this area of the panel. Speaker connections are made in two ways. The SPEAKER 1 connections are made to the more usual barrier terminal strip. The right side of the rear panel includes input and output jacks, a two-position preamplifier sensitivity slide switch, a pair of microphone input jacks, a grounding terminal for record changer or turntable grounding, and a special three-position BALANCE slide switch. This switch allows the listener to "A-B" the level of sound between his left and right speaker systems to determine if the program source is balanced with respect to left and right inputs without having to rotate the front balance control from one extreme to the other. The center position of the switch restores normal two-speaker operation to the system. In all, the rear panel is intelligently laid out. The microphone input jacks (as we have stated in other equipment reviews) would be more useful if brought up front since in custom cabinet installations it is a bit of a nuisance to have to get around to the back every time one wants to connect a pair of microphones to the unit.

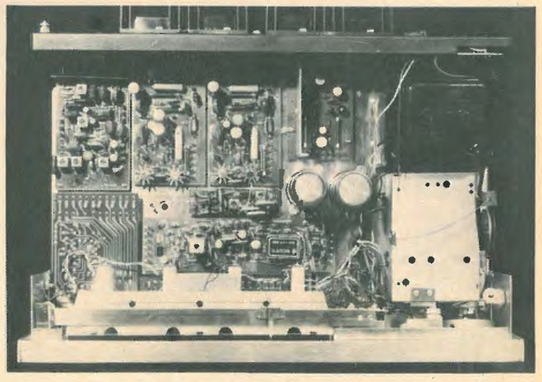

Fig. 2—Top view of chassis.

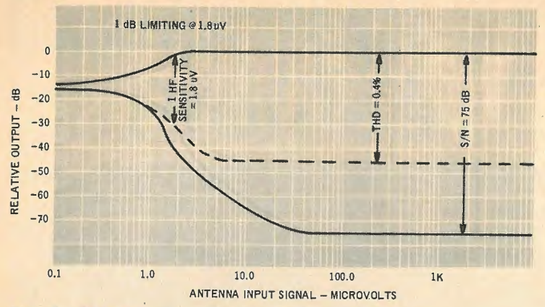

Fig. 3—FM (mono) performance characteristics.

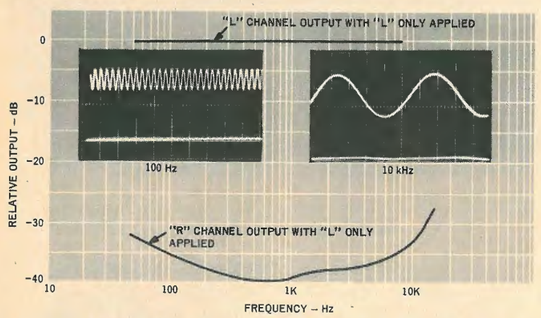

Fig. 4—Stereo FM separation characteristics. Inset photos show separation at 100 Hz (left) and 10 kHz (right).

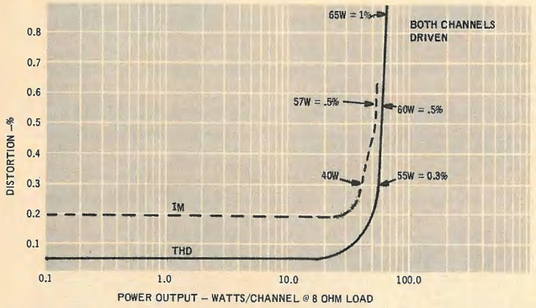

Fig. 5—THD and IM characteristics.

Circuit and Construction

Both circuitry and construction features of the H. H. Scott 387 have so much to commend them that a brief discussion of them is in order. To begin with, we have never seen a more "serviceable" receiver. Seven modular p.c. boards are instantly removable without any tools or soldering iron. The boards are retained in place by nylon "snap-in" pegs and all electrical connections to the boards are made by a series of long pins which mate with eyelet-like receptacles staked to the boards themselves. Thus, if the left-channel driver board should give out some day, simply pop out the defective board and pop in a replacement board. Even after the user warranty has expired (and it includes a generous two years on both parts and labor), H. H. Scott provides a p.c. board replacement service at a nominal $10.00 plus your "used" board. Most of the replaceable p.c. boards may be clearly seen in Fig. 2.

In addition to conventional bi-polar and field effect transistors used liberally in this design, integrated circuits abound as well. The FM IF section has four of them (three in the gain stages and one for the Perfectune circuit to be described later). The multiplex module has one complex IC that does the work formerly done by at least four or five discrete transistors plus a number of diodes. The preamplifier has two IC's, one for each channel. Pretuned permanent filters are used in the i.f. sections for both AM and FM, reducing the problems of alignment to its barest minimum. The power output circuitry is of the complementary symmetry form, employing a matched NPN-PNP output pair supplied with both positive and negative operating voltage (-43 and +43), so that no coupling capacitors are required between output circuit and loudspeakers.

Measurements

Certainly, the H. H. Scott Model 387 has about the best performing and most sensitive tuner section we have ever measured. Major mono performance characteristics are shown in the graphs of Fig. 3. Full limiting and IHF sensitivity were at 1.8 μV (300 ohm input) and, more important, signal to noise had reached an incredible 50 dB at only 2.5 μV and 60 dB at 5 μV of signal input. Translated to more meaningful terms, this means that any incoming signal of 5 microvolts or better would sound as quiet as even the strongest signal received on an *average* tuner, where 60 dB S/N is usually the limit at any signal level. In the case of the Model 387, ultimate S/N reached 75 dB at 50 μV input. THD in mono measured 0.4% while in stereo it was a bit more than 0.8% for full deviation. The muting circuit is effective at signals below 2.5 μV in strength. This means that you will be able to keep the mute switch depressed even when hunting for the distant weak signals. In fact, in our "count" of stations we deliberately scanned the dial with and without the mute circuit in effect and this is the first tuner where we can state that we counted exactly as many received stations in each case, since the mute threshhold is so close to the IHF sensitivity figure. Furthermore, the mute is positive acting—there is no signal strength region in which the mute circuit is in partial effect, so there is no noticeable distortion or attenuation caused by this well engineered circuit.

Stereo FM separation, plotted in Fig. 4 was as good as any we have ever measured, reaching 40 dB at mid-band frequencies and remaining better than 30 dB at every frequency from 50 Hz to over 10 kHz. In addition to denoting an excellent multiplex circuit, this suggests that the i.f. section is extremely phase linear and well aligned. While we normally do not show graphs of right *and* left channel separation (usually, the results are within 1 or 2 dB of each other), it should be noted that in the case of the H. H. Scott 387, balance between left and right channel separation was within 0.5 dB across the whole frequency band. Published specifications with respect to capture ratio and cross-modulation rejection were confirmed, while selectivity was measured at 45 dB, somewhat better than the 42 dB claimed. While this latter parameter is not the highest we have seen, we encountered no case of alternate channel interference in our listening tests.

Perfectune

A very valid tuning indication method, trademarked "Perfectune" by the people at H. H. Scott, has been incorporated in the Model 387. Instead of the usual "zero-center" tuning meter, a special integrated circuit has been incorporated in the FM i.f. module. Fed with d.c. voltages derived from the ratio detector circuit, the IC acts as a "gate" for the Perfectune indicator light, permitting it to become illuminated only when a station has been tuned to precise center of channel, the point of lowest distortion and best audio recovery. Interestingly, in the presence of a very strong signal, the range of dial spread over which the lamp remains illuminated is somewhat broader than it is for a weaker signal. This is, of course, as it should be, since center tuning of a strong station is somewhat less critical than proper tuning of a relatively weaker signal. We noted, too, that in tuning into a stereo station, the stereo indicator lamp

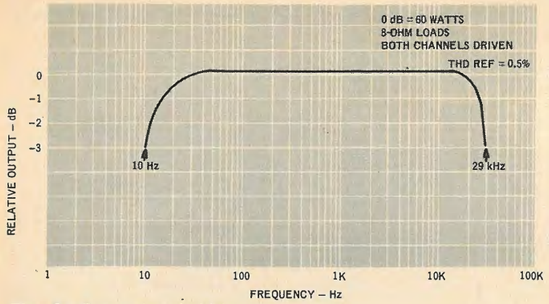

Fig. 6—Power bandwidth.

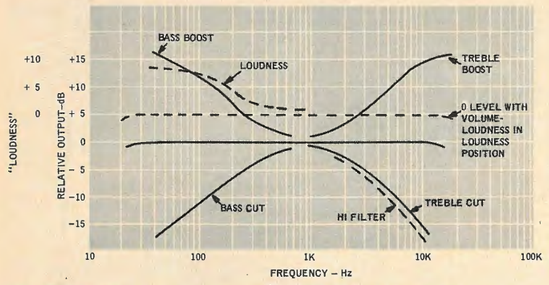

Fig. 7—Tone control, loudness, and filter characteristics.

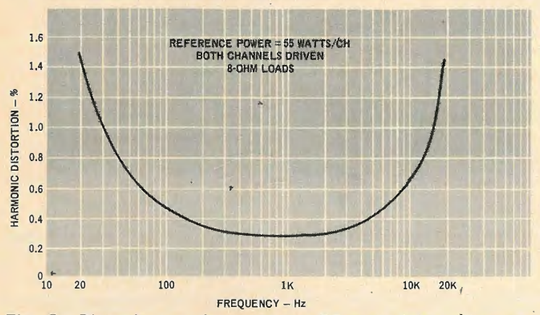

Fig. 8—Distortion vs. frequency at 55 watts/channel power output level.

becomes illuminated as the station frequency is approached and remains on for some distance to either side of the Perfectune indication. In that connection, the stereo indicator is completely positive in its action and never gave a false indication because of interstation noise, regardless of the setting of the mute switch.

Harmonic Distortion and IM for the amplifier section are plotted in Fig. 5. The former reached its rated value of 0.5% at 60 watts per channel with both channels driven (as against 55 watts claimed), while the latter reached 0.5% at 57 watts. One per cent THD was noted at a power output of 65 watts per channel with an 8 ohm load and both channels driven. At 20 kHz, the response (with tone controls set for "flat" response) is down some 3 dB. A slight boosting of the treble control restores uniform response to this upper audio limit. At the low end, audio response is down 1 dB at 17 Hz. Tone control action, shown in Fig. 7, is symmetrical and the range is adequate. A feedback Baxandall circuit is used, providing variable crossover and the ability to introduce moderate amounts of low end and high end boost or cut without affecting mid-range response. We did find the loudness compensation circuit (the response of which is also shown in Fig. 7) to be a bit confusing.

As is pointed out in the instruction manual, depressing the LOUDNESS push button (to provide *uncompensated* flat response) results in the overall *decrease* in volume level of about 5 dB (at mid-band). We would prefer to see the "normal" (or un-pushed) position of the switch as the uncompensating position, since loudness compensation is a "sometime" thing. If there has to be a level shift from one position of the switch to the other, we would have preferred the level to decrease when using the compensating position of the loudness-volume switch since this position is likely to be used at lower listening levels.

The high cut filter, whose characteristics are also plotted in Fig. 8, follows the curve of maximum treble cut almost exactly (having a slope of only 6 dB per octave) and is therefore somewhat redundant, in that it "cuts in" too far to the mid-range frequencies. Thanks to the extreme sensitivity and quieting ability of the 387 we did not find it necessary to use this filter on any stereo FM listening. For owners of "scratchy" old 78 rpm records, the high frequency loss won't mean much anyway.

Listening Tests

The Model 387 is most outstanding in its FM performance. The Perfectune light lit up for us no fewer than 57 times as we scanned the FM dial and in 27 of those instances, the stereo indicator light flashed as well. That's using a multi-element directional antenna in our near-New York City location, but NOT using our rotator. We received some stations clearly and with adequate quieting during which the signal strength meter *barely moved* and when you consider that a 10 microvolt signal causes that meter pointer to deflect one full division that should give you an idea of the kind of signals were were able to listen to and enjoy. Calibration was just about perfect from one end of the dial to the other (and that was a blessing, because some of the stations received were so far out of our area that we had to consult our national list of station frequencies to identify some of them.

Audio power was more than adequate at all levels of single or dual speaker-pair listening in both FM and PHONO settings. Residual hum in all instances was inaudible, confirming our -68 dB reading for phono and the -80 dB reading in high-level input sources. We also experimented with the microphone inputs, using a single dynamic microphone to mix with and comment upon a taped program we had recorded earlier. By placing the MONO-STEREO switch in the MONO position, the 387 serves as an effective two-channel mixer in this configuration. It should be noted that when two sets of speakers are used simultaneously, the circuitry is arranged to insert high wattage 2-ohm resistance in series with the output lines. This is done to prevent the net impedance presented to the amplifier from going below the safe 4-ohm limit. Although this feature does reduce maximum available audio power to the combination of speakers, there was still plenty in our instance, and it is preferable to lose a fraction of the available power than to keep blowing speaker line fuses because of too low an impedance load connected to the output terminals. Our transient response tests indicated excellent damping, though this parameter was not specifically measured, since no published specification was available with which to compare it.

The H. H. Scott Model 387 is a big receiver—big in power and performance, as well as in physical size. The serious audio enthusiast will, upon auditioning it, quickly recognize it as the product of one of the pioneering companies in our industry. While H. H. Scott was there when it all began, they have certainly kept up with technological progress in solid-state design—that is clearly evidenced by the Model 387.

Leonard Feldman