

## SCOTT 311 FM TUNER

Practically any good FM tuner on the market for home-music-system use now boasts of a sensitivity that would have been impossible five years ago, so that it is no longer enough that we say that "such-and-such a tuner has a sensitivity of less than five microvolts" to make it a good buy. Sensitivity it must have, of course, but that is almost taken for granted. More important is the quality of reproduction, the freedom from drift, and the reliability of performance.

Hermon Hosmer Scott has always had a reputation for making fine products, and even though the 311 FM tuner is low priced—in comparison with other Scott tuners—it turns in a performance and quality report that is enviable. Sensitivity is claimed to be 3  $\mu$ v for 20 db of quieting; automatic gain control applied to the r.f. and first i.f. stages maintains uniform output over a wide range of input signal intensity; wide-band design ensures drift-free reception.

Following the publication of two papers from M.I.T. a few years ago, several manufacturers have reduced the findings of the laboratory to practical and manufacturable designs. To improve the tuning characteristics of FM receivers and to reduce the necessity for micrometer adjustment of the tuning for optimum sound quality, a wide-band ratio detector circuit—the subject of one of the M.I.T. papers—is employed in the 311. The detector circuit has a bandwidth of some 2 megacycles, following an i.f. amplifier with a 150-ke pass band. Thus the i.f. amplifier is the governing factor with respect to selectivity, and minor variations from the absolute center of the discriminator pass band do not cause a degradation of quality. With this type of circuit, the selectivity can be considerably greater than with conventional circuits, if properly engineered, and there is no recurring signal from stations which are



Fig. 5. Hermon Hosmer Scott's new 311 FM Tuner is compact, mounts in an opening  $4\frac{1}{16}$  by  $12\frac{1}{2}$  inches, and is  $8\frac{1}{2}$  inches deep.

"detected" on the returning slope of the discriminator curve. This results in a true "one-spot" tuning which is not particularly critical. With a sensitive tuning meter, the set becomes as simple to tune as the garden-variety AM radio.

The Scott 311 tuner, shown pictorially in Fig. 5 and schematically in Fig. 6, is of simple, if rather modern, styling. The panel is gold finished, the tuning dial is of transparent plastic with white lettering, and is illuminated internally, and the dial index pointers are of red plastic. The large outer knob is directly coupled to the tuning capacitor shaft for fast rotation, while the smaller knob is a vernier for fine tuning. The tuning meter is very sensitive, and because of its low damping the optimum tuning is located readily. The gold-finish knob at the lower left corner of the panel controls a.c. power and volume—if the output were to be fed to a control amplifier, this control could be used only for level setting, with a.c.

power being controlled from the other unit. The tuner may be mounted in the user's own cabinet, or may be housed in a metal necessary case for table-top or bookshelf use. It combines neatly with the Scott 121-B Equalizer-Preamplifier, as both have the same size panel and the same styling.

As will be noted from the schematic, the tuning meter is located in the plate circuit of the first tube—which is a cascode r.f. stage—and the a.v.c. voltage is fed to this tube from the limiter circuit. While most tuners employing the ratio detector do not also employ limiters, this is usually an economy measure, for when limiters are used—there are two in the 311—the ratio detector performs admirably. Because of the wide-band detector, there is no need for automatic frequency control, and with temperature-compensated circuitry there is a minimum of drift anyhow. Under test, the tuner was set to a New York station at the beginning of a week and properly tuned when the set was fully warmed up. Thereafter it was tuned on and off daily for seven days with no further adjustment, and the station remained perfectly in tune with excellent tone quality.

A practical test of sensitivity is shown by satisfactory reception at our Long Island location from WNHC in New Haven—a distance of approximately 55 miles and at an angle of 120 deg. from the main axis of a TACO six-element FM Yagi antenna. This seems to indicate a completely satisfactory sensitivity and stability, for the station was received consistently several evenings in a row.

As is usual with modern tuners, the 311 is self powered, using a 6X4 rectifier and adequate resistance-capacitance filtering. The tuner circuit uses a 6BQ7A as a cascode r.f. stage, a 6U8 as oscillator-converter, three 6AU6's as i.f. amplifiers and limiters, two crystal diodes in the ratio detector circuit, and a 12AU7 as audio amplifier. Considerable "flat" feedback is applied over the audio stages to provide a low-impedance output, permitting the use of a relatively long connecting cable, if necessary, without high-frequency attenuation.

From a practical standpoint in day-to-day use, the 311 tuner appears to have performance which belies the simple appearance of the chassis and panel, and is quite likely to surprise anyone who studies its characteristics closely.

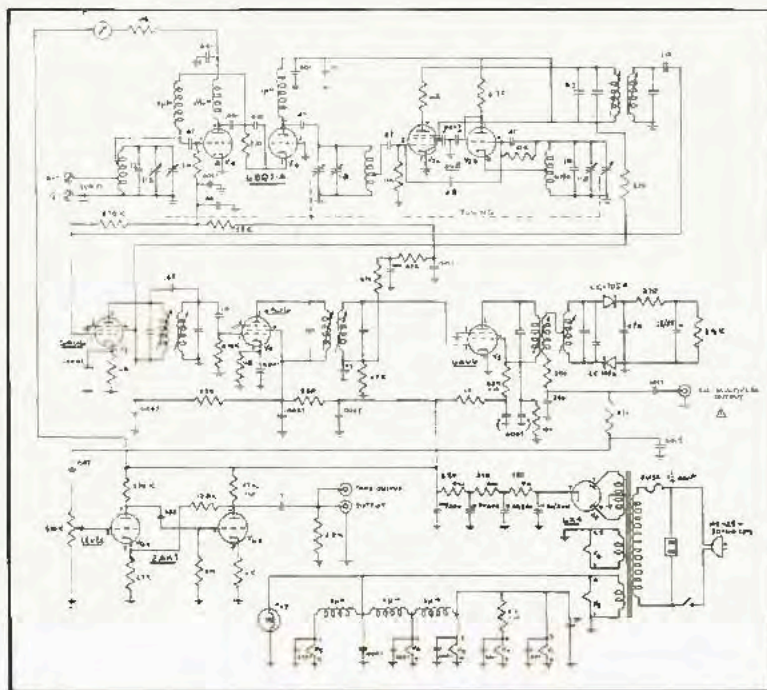


Fig. 6. Schematic of the Scott 311 FM Tuner.

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