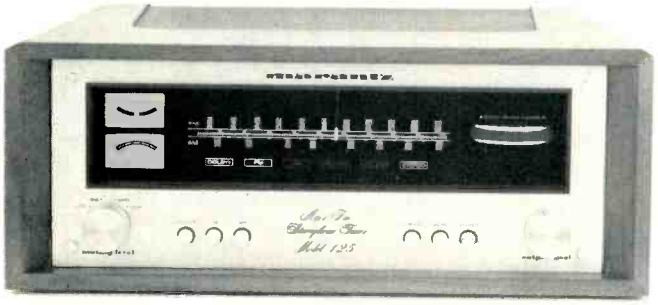
Equipment Profiles

Marantz Model 125 AM/FM Stereo Tuner



MANUFACTURER'S SPECIFICATIONS
FM Section
IHF Sensitivity: 1.8 μV. **Quieting Slope:** Mono, 56 dB at 5 μV; 61 dB at 10 μV; 71 dB at 50 μV; stereo, 52 dB at 50 μV; 65 dB at 1000 μV. **S/N:** 73 dB in mono; 65 dB in stereo. **Selectivity:** 80 dB. **Capture Ratio:** 1.1 dB. **AM Suppression:** 63 dB. **THD:** Mono, 0.2%; stereo, 0.3%. **Image Rejection:** 100 dB. **I.F. Rejection:** 100 dB. **Spurious Response Rejection:** 100 dB. **Frequency Response:** 30 Hz to 15 kHz ±1 dB. **Stereo Separation:** 42 dB at 1 kHz; 29 dB at 10 kHz. **Output Level:** 100% Modulation, mono, 1.7 volts; 50% modulation Dolby, mono, 580 mV.
AM Section
IHF Sensitivity: 20 μV. **Selectivity:** 48 dB. **I.F. Rejection:** 60 dB. **S/N:** 55 dB. **THD:** 30% Modulation, 0.6%. Output Level: For 30% modulation, 470 mV. **Retail Price:** $329.95.

Ever since Marantz introduced their fabulous 10-B tuner some years ago, the company has enjoyed a reputation for producing FM and AM products that are beyond the ordinary. Their new Model 125 proves that you can remove such luxuries as multi-purpose oscilloscopes (thereby saving more than $200.00 compared with their higher-priced Model 120B) and still come up with a top-performing tuner that will be limited in its performance only by the kinds of radio station signals it receives. To this reviewer, the complete manner in which Marantz chose to publish its own product performance specifications was the first clue to its excellence. How many other manufacturers bother to tell you about three specific points on the "quieting slope"? Yet this information tells more—much more—than the almost meaningless and archaic "IHF Sensitivity." In fact, Marantz has incorporated in this tuner's specs nearly all of the newly proposed measurements that the IHF hopes to make mandatory in the near future.

The new tuner bears the usual family resemblance to other Marantz tuner, amplifier, and receiver products. The gold-anodized front panel measures 15¼ in. by 5¾in. high and extends beyond the classis and metal wrap, so that if you want to custom mount the unit behind a wooden front panel, even an imprecise hand-sawn cut-out will do nicely. The unit measures just under 12 in. in depth, not including panel, knobs, and AM bar antenna (once it's pivoted away from the chassis). "Gyro-touch" tuning, an edge-mounted, thumb actuated flywheel tuning knob, is carried over into this model, and we still find it to be one of the most elegant (and really quite simple) station tuning arrangements around. The two metal-turned large knobs at the lower left and right of the panel are a continuously variable output level control and a four-position (including OFF) muting switch, about which more in a moment. Three push buttons at the lower right take care of power ON/OFF, MONO/STEREO selection, and insertion of a high-blend MPX filter circuit, useful when listening to noisy or weak stereo FM signals. Two of the three matching buttons at the lower left select AM or FM reception. The third button (or rather its nomenclature) caused us our single minor concern as self-appointed consumer-confusion preventer. The button is labelled FM DOLBY, and if you were confronted with those words, wouldn't you think that a Dolby decoder (for new FM Dolby broadcasts) was included? Well, what is included is a choice of de-emphasis settings—the usual 75 microseconds for ordinary mono or stereo FM reception, and 25 microseconds, now sanctioned by the FCC for stations using Dolby encoding. To properly decode such broadcasts and gain the attendant noise reduction and dynamic range advantages, you'd still need an outboard Dolby box, though we suspect that most audiophiles interested in a tuner of this quality will already have the outboard Dolby unit. Incidently, then the Dolby button is depressed, the output level is no longer governed by the front-panel level control but is available at fixed level (see specs above) so that you can permanently calibrate your associated Dolby decoder for correct playback decoding. If you don't own a Dolby decoder in separate form, you'd be better off listening to Dolby-encoded broadcasts without the Dolby button depressed.

The rear panel, pictured in Fig. 1, has the required pair of output jacks, a detector jack which Marantz calls an *FM Quadradial Output* (for a four-channel adaptor of the

Fig. 1—Rear panel of the Marantz 125.

future), a line fuse, an unswitched a.c. convenience receptacle, and four push-to-insert-wire connection terminals for 300-ohm, 75-ohm, and AM external antennas. Next to these terminals is a two-position slide switch identified as an "antenna attenuator," useful for reducing signal strength if you're "right on top" of a transmitter. In our laboratory tests, which included injection of signals up to 200,000 μV, we did not find it necessary to use this switch for any reason of overload or distortion, but we know of cases where listeners are bombarded by *volts* of signal, under which circumstances the extra attenuator might be helpful. The long AM ferrite-bar antenna pivots away from the signal insulating qualities of the metal rear panel.

Removal of the walnut-clad metal wrap supplied with the 125 reveals the usual, orderly Marantz approach to circuit identification and layout. Each circuit board is fully shielded by its black cover and, where alignment points are required, strategically located holes, suitably identified, are provided in this fully shielded unit. While a schematic diagram of the unit was not supplied with our test sample, discussions and correspondence with the people at Marantz yielded the following insight into some of the design philosophy.

Marantz suggests that the performance of an FM tuner is determined, largely, by the performance of its i.f. section. The ideal amplifier should pass the entire band of frequencies which contains desired sideband information, with a minimum of phase distortion. On the other hand, if one wants to stress selectivity or the ability to reject unwanted frequencies outside the passband, a familiar technique has been to use crystal or solid state filters. With these, unfortunately, phase distortion sometimes tends to be high. For the i.f. section of the 125, Marantz engineers claim to have developed a constant phase filter. Phase linearity of frequency dependent networks is expressed in terms of "group delay"—the rate of change of phase with frequency and the use of an 18-pole, linear-phase LC filter in the Model 125 results in a group delay difference of less than 100 nanoseconds over the critical 200 kHz center portion of the passband. Marantz claims that this represents a 15-to-1 improvement over group delay difference achieved by other, more conventional design approaches. In fact, they go so far as claiming that the newly designed 18-pole filter actually gives performance superior to that of their now-classic Model 10-B in such areas as IM and THD, separation stability, lack of intermodulation products between main channel and any SCA signals which might be present, and improved "quieting" sensitivity. The internal layout of the chassis can be seen in Fig. 2.

FM Measurements

Some of the claims made by Marantz in the above discussion were quickly confirmed as we began to measure performance. Consider the data shown in Fig. 3. Aside from reaching an IHF sensitivity of just under 2.0 μV, quieting was actually better than −70 dB at a mere 20 μV of input signal, having reached a listenable 50 dB at a mere 2.2 μV in mono. Equally impressive was the 50 dB quieting point in stereo, which occurred at an input signal of only 18 μV. Mono THD was as low as our equipment would allow us to read, 0.09%, while in stereo (a far more difficult achievement) THD was only 0.15% for mid-frequencies. Ultimate quieting reached 75 dB for mono, 69 dB for stereo—both figures well beyond those stated by Marantz.

Stereo separation, plotted in Feb. 4, was 42 dB for mid frequencies and 29 dB at 10 kHz, exactly as claimed. At low frequencies (down to 50 Hz) it was still above 35 dB. In the same graph, THD versus frequency is plotted for mono and stereo operation. Even at the 7 kHz extreme (the highest frequency for which audible harmonics would occur in FM transmission), mono THD was just a bit over 0.1%, while the stereo reading was 0.5%. Despite the excellent rejection of carrier products by the Marantz 125 MPX circuitry, frequency response is not sacrificed at the high end. It remains within 0.5 dB all the way out to 15 kHz. Other measurements included capture ratio of 1.0 d¹b, selectivity of 80 dB as claimed, spurious response rejection of 98 dB, and image rejection of a bit better than the 100 dB claimed. Stereo threshold occurs at an ideal 7 μV, by which time S/N in stereo is already −42 dB and THD is down to 1.5%. Three of the four muting positions are ideally set to provide thres-

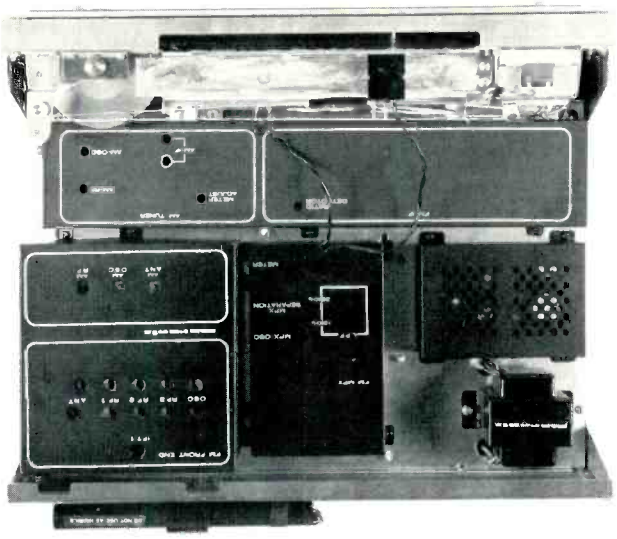


Fig. 2—Internal view.

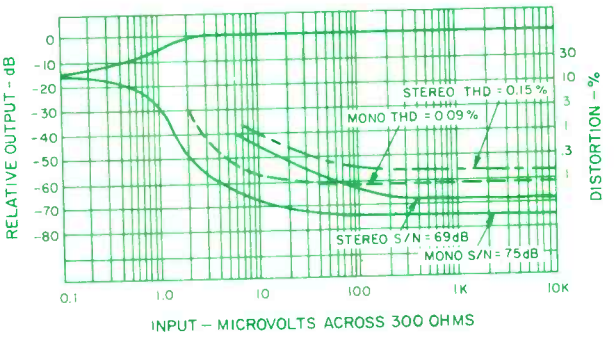


Fig. 3—FM quieting and distortion characteristics.

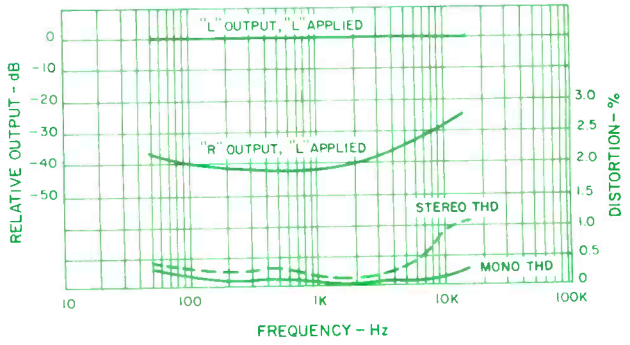


Fig. 4—FM separation and distortion versus frequency.