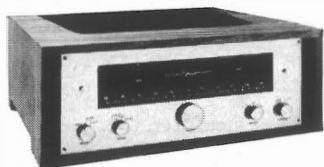


relative levels of the 5,000 cps carrier and its sidebands, is called "per cent IM distortion."

Intermodulation distortion is more serious than simple harmonic distortion, because it results in the creation of spurious output signals that are not harmonically related to the original input signals. These are distinctly unmusical, and tend to make the sound harsh and dissonant. Actually, harmonic and IM distortion are caused by the same kind of non-linearity, and the presence of one implies the presence of the other.

MARANTZ MODEL 10B FM STEREO TUNER



● RARELY do I encounter a high-fidelity component that is so outstanding that it is literally in a class by itself. Not long after I had received one of the new Marantz 10B stereo FM tuners for testing, however, I realized that another component of that kind had come my way. It is difficult to describe this remarkable tuner in a dispassionate manner—nor would it be fair to do so. The Marantz 10B has a strong subjective appeal, as well as indisputably high performance, so perhaps I may be forgiven for occasionally sounding like a Marantz advertising copy writer. The 10B would arouse strong feelings in any dedicated audio enthusiast, and I am no exception.

The oscilloscope-type cathode-ray-tube (CRT) tuning indicator is a striking feature of the Marantz 10B. Frankly, I had considered this a gimmick (and a rather expensive one at that) until I had the opportunity to use it. I find it the most logical and informative tuning indicator I have ever used, and it makes most meters and eye tubes seem ineffectual by comparison. The display on the CRT is a horizontal line whose width indicates instantaneous FM deviation (audio modulation) and whose vertical position on a marked-off scale is logarithmically proportional to signal strength.

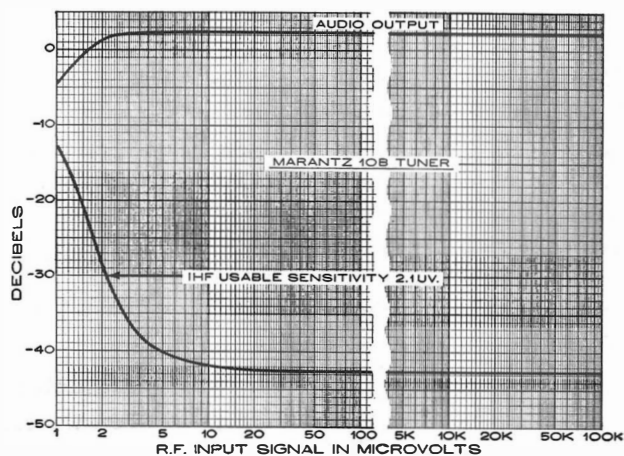
Multipath distortion in the received signal shows up as ripples on the horizontal line, indicating partial cancellation of the signal caused by out-of-phase reflections. Such distortion can almost always be minimized or eliminated by rotating the antenna until the line is smoothest. Although minor amounts of multipath may not cause audible distortion, I was intrigued to find that distortions and harshness that I had previously blamed on FM stations or on tuner deficiencies were in every case owing to multipath effects. Rotating the antenna for optimum display on the CRT cleaned up these signals completely.

Space permits comment on only a few of the features of this tuner. Its tuning dial is silky smooth, completely linear, and calibrated with an accuracy of ± 25 kc (about the width of the dial pointer). The stereo-indicator lamp glows only upon receiving a stereo broadcast's pilot carrier—it cannot flicker on noise or modu-

lation peaks. The underside of the chassis reveals an impressive number of toroidal inductors, many on pot cores. These expensive, premium-quality components are never found on ordinary home-entertainment equipment. The Butterworth-filter i.f. section never needs alignment, and is unaffected by tube changes. It has a flat, phase-linear 200-kc pass band, with skirt slopes of 108 db per octave. This far exceeds the performance obtained with ordinary i.f. transformers, and makes adjacent-channel interference a most unlikely occurrence.

Meaningful laboratory measurements on this tuner require very special test equipment. No commercial signal generator has sufficiently low distortion or noise to verify the manufacturer's claims. Hence, I could do no more than ascertain the limits of my own test instruments. For example, I measured a residual distortion of 0.75 per cent and a hum level of -59 db, referred to 100 per cent modulation. These are inherent limitations of my signal generator, and the Model 10B apparently betters these figures by a significant degree. Marantz' specifications are 0.2 per cent and -75 db, respectively, and I have no reason to doubt those claims. However, I did measure the IHF usable sensitivity as 2.1 microvolts, with full limiting occurring between 5 and 10 microvolts.

I measured a mono frequency response of ± 0.2 db from 20 to 15,000 cps, and stereo channel separation, as indicated by my test equipment, was better than 28 db from 100 to 11,000 cps and better than 22 db from 20 to 15,000 cps. I have never measured a more uniformly good channel separation, and again I have no way of determining to what extent it is a measure of my instru-



ments rather than of the Model 10B tuner. Marantz states that the actual separation is better than 45 db from 20 cps to 500 cps and better than 30 db up to 15,000 cps. An elaborate multi-section low-pass filter prevents any 19-kc stereo pilot signal from reaching the tuner's audio-output stages.

How does the Model 10B sound? Well, I have yet to hear on it any distortion or extraneous sound that cannot be attributed to the station, the program, or other components. Its clarity and ease are outstanding. As for sensitivity, I have measured other tuners with comparable or even marginally better IHF usable sensitivity, but I have never used one which could pull in so many stations so

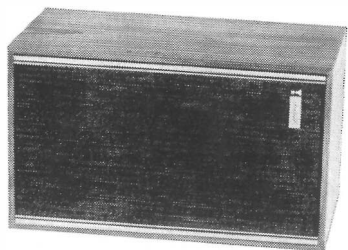
(Continued on page 51)

cleanly and with so little distortion. With my eight-element Yagi antenna pointed west, I picked up forty-five fully limiting stations in one evening. On most channels I could receive one or two other stations by rotating my antenna (with no interference, thanks to the tuner's excellent capture ratio).

Although I have only touched on the high spots of the Marantz Model 10B, my enthusiasm for it is complete: I have never seen a tuner to compare with it. Selling for \$600 (plus \$36 for an oiled walnut cabinet), and worth every cent of it, the Marantz 10B is obviously not for everyone. Those who can afford it should have it—the rest of us may perhaps be forgiven our envy of the fortunate owners.

For more information, circle 188 on reader service card

JAMES B. LANSING LANCER 77 SPEAKER SYSTEM

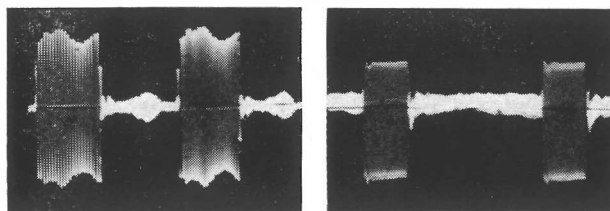


● THE JBL LANCER 77 speaker system is unique in its use of a passive radiator combined with a driven cone for reproducing low audio frequencies. Over most of its range, the Lancer 77 functions as a two-way system, with a 10-inch high-compliance woofer and a 2-inch cone tweeter. The 2,000-cps crossover point is undetectable by listening or by measurement.

The JBL LE10A woofer used in the Lancer 77 has a two-section, partially plasticized cone driven by a 3-inch-diameter edgewound copper-ribbon voice coil within a six-pound magnet structure. The cone has a rolled edge surround made of a soft, rubber-like material designed to terminate the cone edge acoustically to prevent the generation of spurious modes of vibration. The free-air resonance of the driver is 15 cps.

The enclosure, measuring 23½ inches wide, 14 inches high, and 12 inches deep, may be placed horizontally or vertically. The Lancer 77 uses a quasi bass-reflex design, but instead of having an open port, there is another cone assembly similar to that of the LE10A driver mounted on the front baffle. The passive cone has no voice coil or magnet structure associated with it, and is driven by the rear pressure wave from the driven cone. At middle and high frequencies, the passive cone acts as a rigid surface covering the port opening. At extremely low (subsonic) frequencies, it moves out of phase with the driven cone. Thus, if the driven cone is pushed in by hand, the passive cone moves outward an equal amount. The air-tight construction of the box is evidenced by the fact that the passive cone requires about 2 seconds to return to its neutral position if the other cone is held in place.

At low audio frequencies there is an acoustic phase reversal within the cabinet. The two cones then move in



Oscilloscope photos of Lancer 77's tone-burst response at 650 cps (left) and 10 kc (right) show speaker's fine transient response.

unison, with a radiating surface equal to that of two driven 10-inch speakers, at those frequencies where this is most beneficial. I could watch the two cones move together when reproducing turntable rumble, showing the effectiveness of the design down to the 30-cps vicinity.

The tweeter level is adjustable by a switch on the rear of the enclosure. I used the medium position for all my tests and most of my listening, finding it most pleasing to my ears. The changes in high-frequency level are moderate, however, and the essentially musical character of the speaker is not degraded in any of the switch positions.

Averaging six sets of frequency-response measurements, I obtained a composite response curve which was within ± 5 db from 30 to 13,000 cps. The lows are strong, and there are no significant holes or irregularities in the response. Frequencies above 2,000 cps are depressed a few decibels relative to the middle- and low-frequency level. This depression would probably have been eliminated had I used the high setting of the tweeter-level control.

The harmonic distortion for a 10-watt input was low (under 2.5 per cent) down to about 50 cps, rising to 5 per cent at 40 cps. Below 35 cps the distortion rose sharply, placing the effective lower limit of the speaker's response in this region.

The tone-burst response of the Lancer 77 was generally very good. As with most speakers, there can be abrupt changes in tone-burst response at small frequency intervals. The 650-cps and 10,000-cps tone-burst photos are typical of the speaker's performance over most of the range, with an abrupt start and stop of the burst and little or no ringing. The thickened line between bursts is largely owing to room noise. At 610 cps, some ringing is evident; however, this condition occurred but rarely.

I was gratified by the sonic performance of the Lancer 77. It had a neutral, uncolored sound which came quite close to that of the expensive full-range electrostatic speaker with which I compared it. The highs were well dispersed, the bass full (rather than tight) without being at all boomy or heavy. Even with the grille cloth removed, I could get no sense of the sound coming from one, two, or three radiators. Subjectively, the Lancer 77 resembles a single two-square-foot radiating surface, with complete continuity over the full audio range. The Lancer 77 falls in a price category intermediate between the popular \$100 speakers and the deluxe over-\$200 systems. Sonically, it comes much nearer to the latter group. I listened to it for hours, and enjoyed every minute of it. The JBL Lancer 77 sells for \$156 and is available in a variety of finishes.

For more information, circle 189 on reader service card