

Manger Zerobox 109

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The Manger Zerobox 109 is a mid-sized, 2-way passive loudspeaker with a difference. Instead of the conventional bass-mid/tweeter arrangement, the mid and high frequencies are reproduced by a unique driver known as a Manger Sound Transducer (MSW). This driver features a fairly conventional voice-coil/magnet arrangement, but the more usual cone or dome is replaced by a complex, three-layer, flexible, flat diaphragm assembly designed to support travelling bending waves. The idea is that the vibration of the voice coil sets up bending waves that propagate radially outwards until they are dissipated at the perimeter, with the effective area of the moving surface reducing with increasing frequency. Manger claims that this arrangement results in a more accurate transient response than conventional loudspeakers while maintaining a broad radiation pattern. The woofer is a conventional 8-inch (210mm) cone unit mounted in a sealed cabinet of dimensions 490mm x 260mm x 360mm that weighs 17kg. The passive crossover is specified as having 2nd order low pass and 1st order high pass filters crossing over at a very low 140Hz; the 109 could therefore be thought of as a single driver loudspeaker



with low-frequency enhancement. The nominal impedance is specified as 4ohms.

Figure 1 shows the on-axis frequency response and harmonic distortion performance. The most notable feature of the on-axis response is the unevenness of the mid-frequency range; the response lies within +/-6dB from 40Hz to 20kHz. Response irregularities of this magnitude are sure to be audible. The low-frequency response is extended, having a second-order roll-off with -10dB at around 30Hz. Also notable from Figure 1 are the relatively high levels of harmonic distortion from 200Hz upwards. The second harmonic distortion is seen to peak at around -25dB (5.6%) at 250Hz with the third harmonic around 10dB lower. Although it is

difficult to predict how audible this distortion would be on programme, the figures do indicate that the MSW doesn't behave in as linear a manner as most conventional drivers.

Figures 2 and 3 show the horizontal and vertical off-axis frequency responses respectively. The directivity in the mid-frequency range is excellent, with no trace of the mid-range narrowing found with many conventional bass-mid drivers, and no mid-range cross-over dip (the spacing between the

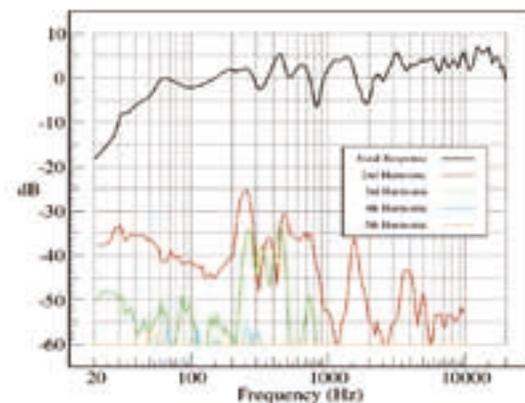


Fig. 1. On-axis frequency response and harmonic distortion.

drivers is effectively small at the crossover frequency of 140Hz). At high frequencies, things are a little less good with the response at 15 degrees off-axis seen to be maintained within 5dB of the on-axis response up to around 8kHz, above which it falls quite rapidly. At wider off-axis angles, there is much evidence of lobing at frequencies above 3.5kHz. The mid-range response irregularities noted in the on-axis response also generally occur off axis.

The step response for the Zerobox 109 is shown in Figure 4. The leading edge of this response is probably the most rapid of any loudspeaker I have tested with the possible exception of the KSDigital ADM2, which has a digital crossover, and, of course, Quad electrostatic loudspeakers. However, the irregularities in the frequency response noted above do manifest themselves as a form of 'ringing' in the step response. Figure 5 shows that the acoustic source position moves less than 2m behind the loudspeaker at low frequencies. This result, along with the rapid step

monitor benchtest

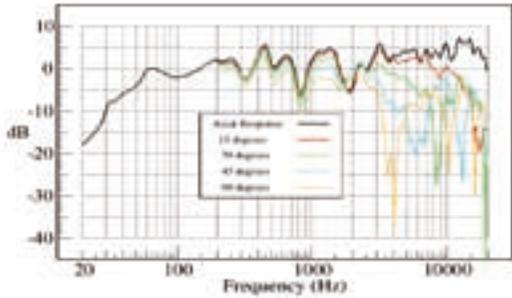


Fig. 2. Horizontal off-axis response.

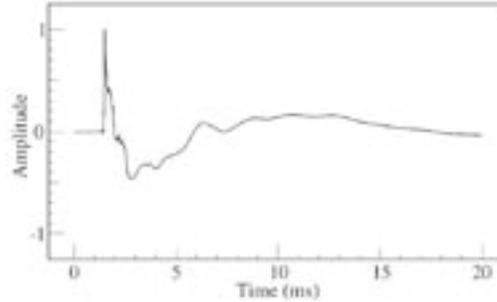


Fig. 4. Step response.

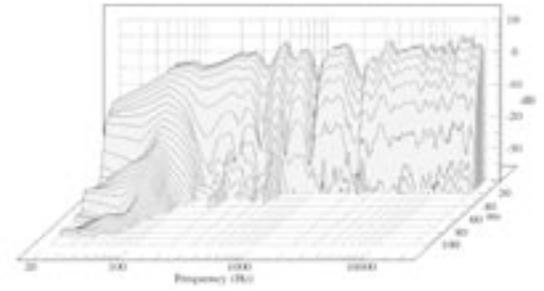


Fig. 6. Waterfall plot.

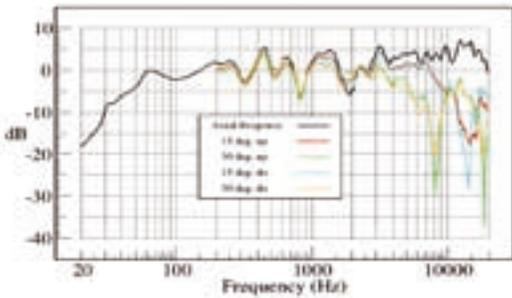


Fig. 3. Vertical off-axis response.

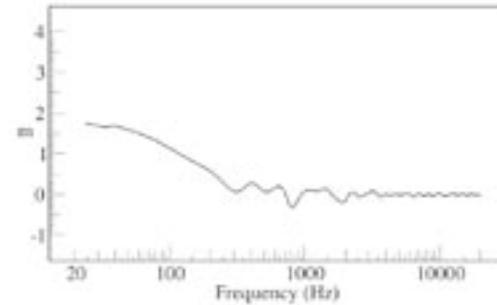


Fig. 5. Acoustic source position.

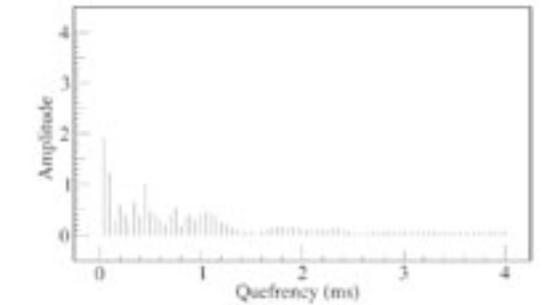


Fig. 7. Power cepstrum.

response, reinforces Manger's claim of an accurate transient response. The waterfall plot (Figure 6) demonstrates a rapid decay at low frequencies with only slight evidence of ringing at about 60Hz and in the mid-band at 500Hz. The other mid-range response irregularities do not ring and so do not appear to be due to resonance; they are therefore more likely due to interference which may be less audible. The power cepstrum (Figure 7) further reinforces that possibility by showing evidence for a lot of reflections or echoes for over 2 milliseconds after the first arriving sound.

Overall, the Manger Zerobox 109 is a mixed bag. The time domain response is, as claimed, very accurate, with very rapid rise and decay of transient signals. However, this transient accuracy is achieved at the expense of frequency response and nonlinear distortion, both of which lie outside the specification for most monitor loudspeakers. The off-axis behaviour is also a mix of good and less good, with a very well controlled mid-frequency range and a narrow and lobed high frequency range. Clearly, the strengths of this loudspeaker lie in its accurate

transient response, with the more traditional design goals of flat response and low distortion very much taking second place. Whether this makes it a better or worse sounding loudspeaker as a result is difficult to assess. In any case, Manger should be applauded for producing a different type of loudspeaker with different qualities. ■

Contact

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