

Yamaha MSP7 Studio

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The Yamaha MSP7 Studio is being marketed as 'carrying on the tradition of the NS10M'. However, although it is a 2-way loudspeaker of similar overall proportions, on paper at least it is a very different loudspeaker. The MSP7 is an active loudspeaker comprising a 6.5-inch woofer and a 1-inch titanium dome tweeter mounted symmetrically above it, with no difference between the left and right of a stereo pair. The tweeter radiates through a shallow horn-type waveguide and the cabinet has two bass-reflex ports. The power amplifiers, crossovers and adjustment electronics are all housed in the cabinet and the heatsink on the rear has vertical fins which, along with the vertical driver layout, mean it is essential that these loudspeakers are only used in the upright, portrait orientation.

Yamaha quotes the power amplifiers as having outputs of 80W into 4ohms for the woofer and 60W into 6ohms for the tweeter. The crossover frequency is 2.5kHz with 5th-order (30dB/oct) slopes and the specified maximum output level is 106dB at 1m. Beneath the heatsink are the input sockets and controls; input is balanced line via an XLR socket, and there are controls for level, low trim (+1.5, 0,



-1.5 and -3dB at 45Hz), high trim (+1.5dB, 0 and -1.5 at 15kHz) and low cut (flat, 80Hz and 100Hz). Although the cabinet is quite small for a loudspeaker of this type, having overall dimensions of 330mm high by 218mm wide by 235mm deep, it weighs a hefty 12.2kg so some care will be necessary to ensure a secure mounting position! Both drivers are magnetically-shielded.

Figure 1 shows the on-axis frequency response and harmonic distortion for the MSP7. The response is seen to be smooth and flat in the midrange, lying between ± 3 dB limits from 55Hz to 8kHz, with a gentle upward slope from 200Hz to 1kHz, and a somewhat uneven response at high frequencies. The main difference

between this response and that of the old NS10 is in the low-frequency range. The NS10 has a 2nd-order (12dB/oct) slope below about 100Hz, whereas the MSP7 continues flat down to around 60Hz below which the response falls with an extremely rapid 8th-order (48dB/oct) slope with -10dB at an impressive 40Hz. The adoption of a high-order, high-pass electronic protection filter is evident, and must be necessary to extend the response of such a small loudspeaker to these low frequencies. The harmonic distortion is impressively low for a loudspeaker of this size, with the 2nd harmonic peaking to -30dB (3%) at 45Hz and

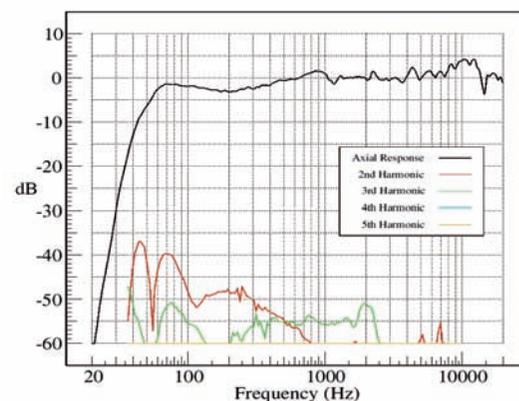


Fig. 1. On-axis frequency response and harmonic distortion.

-40dB (1%) at 70Hz and the 3rd harmonic remaining below -50dB (0.3%) at all frequencies.

The horizontal off-axis response (Figure 2) is very well controlled up to beyond 15kHz with no appreciable mid-range narrowing or change in directivity through the crossover frequency. Figure 3 shows that the vertical off-axis response shows only a very narrow dip in the downwards direction at the crossover frequency due to the interference between the outputs of the drivers.

The time domain responses for the MSP7 are depicted in Figures 4 to 7, which show the step response, the acoustic source position, the power cepstrum and the waterfall plot respectively. The response of the loudspeaker to the leading edge of transient signals can be assessed from the step response and acoustic source position. The step response for this loudspeaker is fairly typical for a compact 2-way loudspeaker with the mid-range components of the signal peaking around 500

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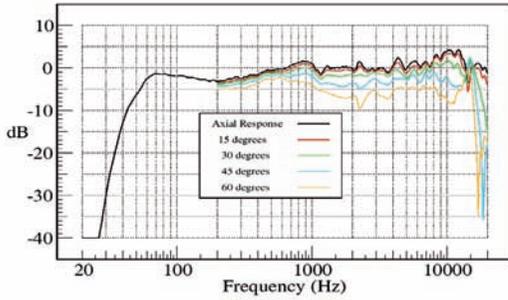


Fig. 2. Horizontal off-axis response.

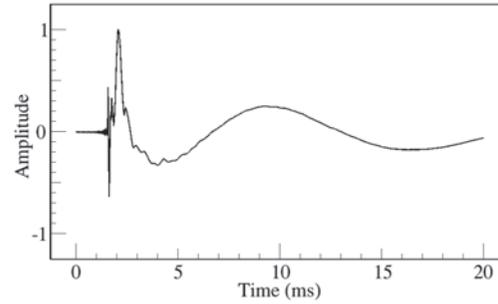


Fig. 4. Step response.

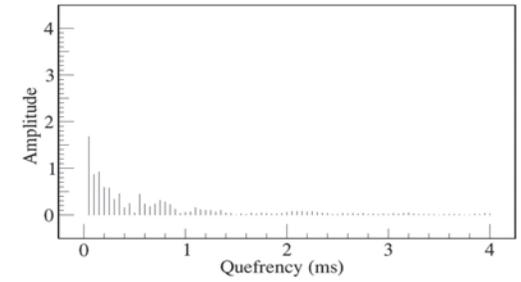


Fig. 6. Power cepstrum.

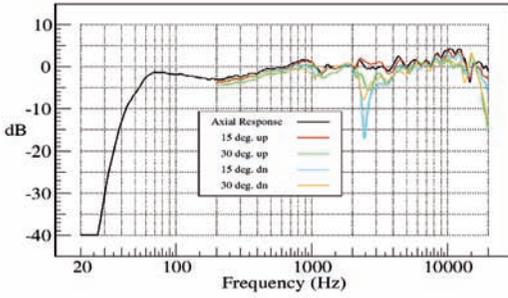


Fig. 3. Vertical off-axis response.

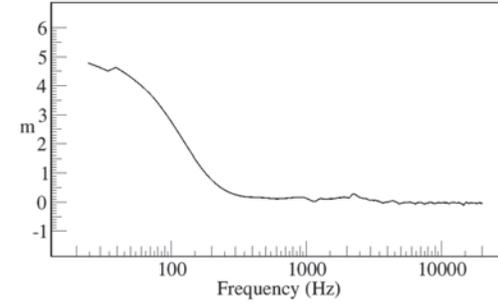


Fig. 5. Acoustic source position.

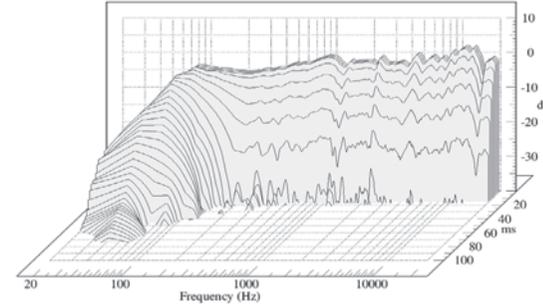


Fig. 7. Waterfall plot.

microseconds after the high frequencies. The acoustic source position is, however, not typical, showing that the low frequencies are delayed such that they effectively emanate from a position nearly 5m behind the loudspeaker. This is an inevitable consequence of the adoption of an 8th-order roll-off and demonstrates one of the compromises that result from this design philosophy. The power cepstrum shows only slight evidence of an echo after about 500 microseconds but is otherwise quite smooth. The waterfall plot (Figure 7) shows how quickly the tail end of transient signals

decay. The MSP7 has a very clean waterfall plot with no evidence of any mid-range resonances and a fairly rapid decay at low frequencies, despite having such a rapid roll-off in response.

Overall, the Yamaha MSP7 Studio does its intended job extremely well. The designers have chosen to extend the low frequency response of this small loudspeaker without introducing high distortion and in doing so have compromised the integrity of the leading edge of low-frequency transient signals. However, the compromise has been managed very

well and the result, given the intentions, is probably as good as could be expected. This aspect of the design of the MSP7 is very different from that of the old NS10 though, and those people who use the old speaker because of its particularly fast low frequency response may possibly not take to the new one. Oh, and it has a black cone. ■

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