Presonus Sceptre S8

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The Sceptre S8 is the largest of a range of two coaxial monitors from Presonus. It consists of an 8-inch (200mm) glass-reinforced paper cone woofer and a 1-inch (25mm) compression driver tweeter mounted behind the woofer and firing through a rectangular horn that shares the same axis as the woofer. Beneath the drivers on the front panel is a slot bass reflex port. The cabinet is quite large with external dimensions of 290mm wide x 338mm deep x 400mm high and weighs 11kg. All power amplifier, crossover, equalisation and protection circuitry is housed inside the cabinet with no external heat sink fins. On the rear panel are balanced XLR and TRS Jack input sockets, along with a level control and IEC mains socket and power switch. Also on the front panel are switchable controls for HF Driver (0, +1, -1.5, -4dB), High Pass Filter (0, 60, 80, 100Hz) and Acoustic Space (0, -1.5, -3, -6dB). Internally, driver time-alignment and equalisation is achieved using DSP technology by Fulcrum Acoustic. Presonus specifies 90W Class D power amplifiers for both woofer and tweeter endowing the S8 with a claimed peak SPL of 116dB at 1m distance (mounting not specified). The crossover frequency is specified as 2.4kHz.

Figure 1 shows the on-axis frequency response and harmonic distortion performance for the S8. The response is seen to be somewhat uneven but lies just within ±3dB limits from 45Hz to 16kHz, with a very rapid 10th-order (60dB per octave) low-frequency roll-off with -10dB at 38Hz. The harmonic distortion is measured with an acoustic output of 90dB SPL at 1m distance and is seen to lie below -40dB (1%) at all frequencies above 85Hz for the 2nd harmonic and 100Hz for the 3rd harmonic, with peaks to only -34dB (~2%) and -30dB (~3%) respectively at 60Hz. The horizontal and vertical off-axis responses are shown in Figures 2 and 3 respectively. The directivity over ±30° in both planes is reasonably well-controlled and lacks the interference notch at crossover often encountered with non-coaxial designs. At wider angles, however, the horizontal response exhibits some deep notches at 2kHz and 3.5kHz which may or may not be problematic depending on room acoustics.

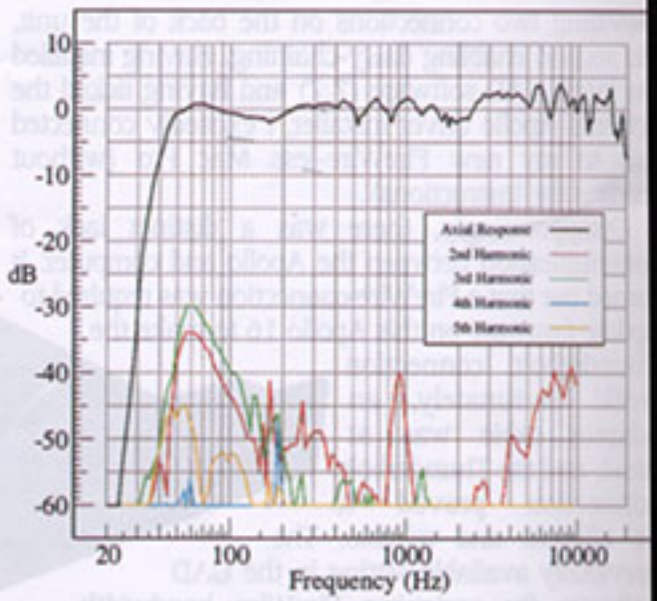

Figure 1. On-axis frequency response and distortion.

The response of the S8 to a step input signal is shown in Figure 4. It can be seen that the high- and low-frequency parts of the signal rise at exactly the same time, indicating perfect time-alignment between the drivers. There is a delay of about 2.5 milliseconds, equivalent to moving the speaker about 1m backwards, due to the DSP, which should be borne in mind if these speakers are mixed with others in a multispeaker system. The acoustic source position, shown in Figure 5 shows that the very low frequency parts of a transient signal appear to emanate from a position a further 6m behind the position of the mid- and high-frequencies; a consequence of the rapid 10th-order roll-off. Figure 6 shows the power cepstrum, which highlights any echoes in the response. There is evidence of quite

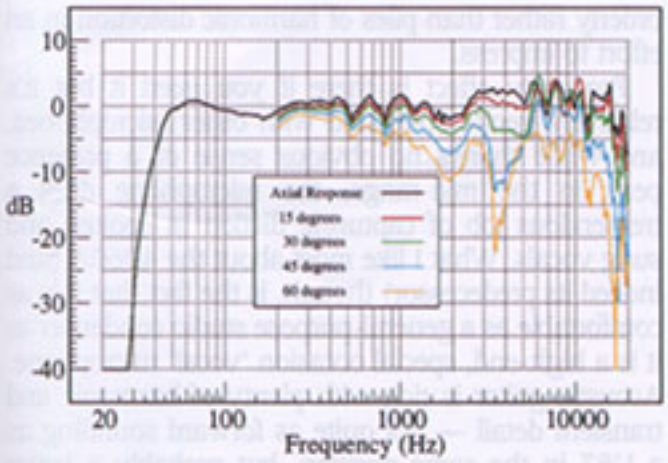

Figure 2. Horizontal directivity.

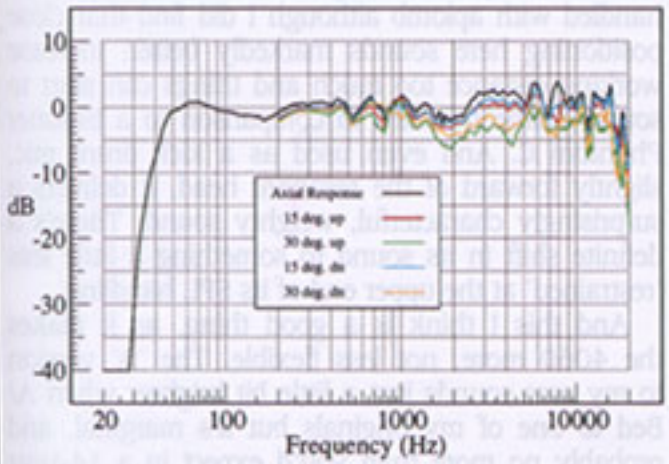

Figure 3. Vertical directivity.

strong activity after about 0.4 milliseconds, equivalent to a path length difference of about 140mm, which may be responsible for some of the frequency response irregularities. The combined time/frequency performance of the S8 is shown as a waterfall plot in Figure 7. The decay rate at low frequencies is slow, but no slower than many speakers with shallower

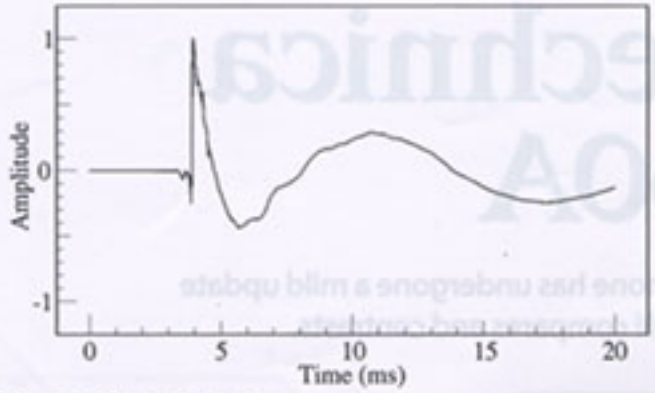

Figure 4. Step response.

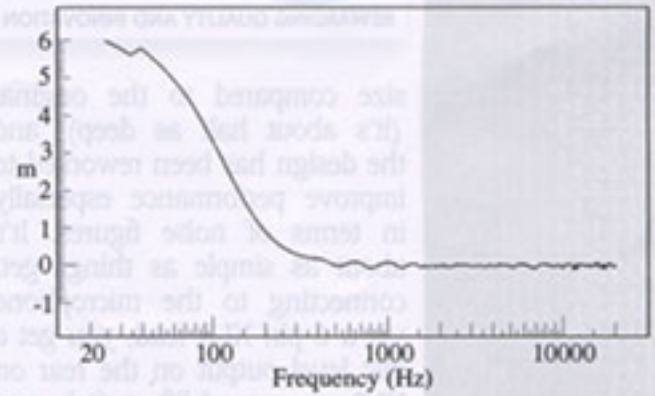

Figure 5. Acoustic centre.

low-frequency roll-offs, and there is some resonant activity that corresponds to a notch in the on-axis response at 550Hz.

Overall, the Presonus Sceptre S8 is a solid performer, its coaxial design ensures that the off-axis responses are consistent and, in combination with the accurate DSP time-alignment, should give a very good approximation to a point source regardless of off-axis angle. The frequency response is more uneven

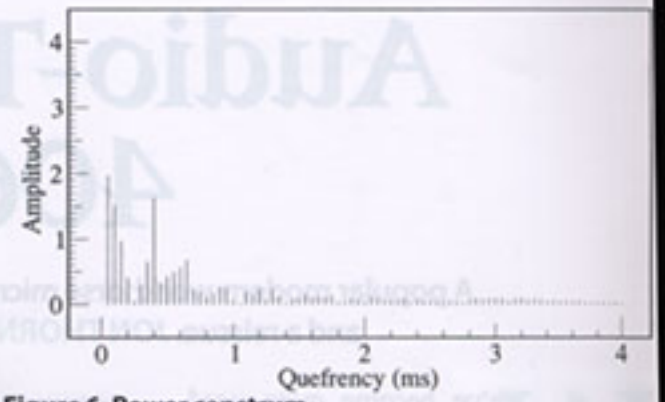

Figure 6. Power cepstrum.

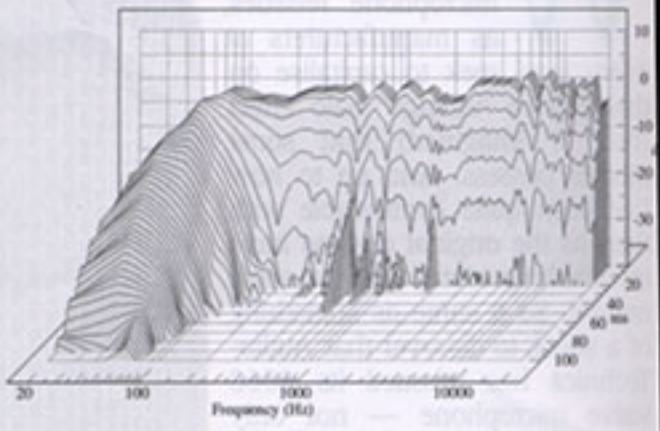

Figure 7. Waterfall plot.

than may be expected, given the DSP equalisation capability, particularly as most of the irregularities are present off-axis too; however, this may be offset by the accurate mid- and high-frequency transient response. ■

Contact

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