Small PA
Concept
Measurement Data
This concept prototype developed by Sausalito Audio uses 2 x 6.5” woofers and a 1” throat compression. It is a 2 ½ way design with the crossover to the CSA waveguide at 1050Hz. For this prototype the box is sealed although it would benefit from adding a port. Three channels of amplification are used with DSP for all signal manipulation. The overall dimensions of the Conic Section Array waveguide are 7.5”W x 3.5”H x 5”D.

The lower woofer rolls off at 500Hz.

All measurements were made at Sausalito Audio which does not have a full anechoic chamber. The data is anechoic to ~500Hz and becomes increasingly corrupted by room reflections below that. Below ~150Hz the data should be largely disregarded.

![Figure 1: Spinorama chart for the Small PA Concept Prototype. For information on how to interpret this chart, please see “Interpreting Spinorama Charts” on the SA web site.](image)
Figure 2: Frequency response curves at the referenced horizontal angles. $0^\circ$ vertical is taken as the center of the mouth of the waveguide. For CSA loudspeakers, it has been Sausalito Audio’s convention to use $20^\circ$ horizontal, $0^\circ$ vertical as the reference axis.

Figure 3: The data from figure 2 normalized to the reference axis of $20^\circ$ horizontal, $0^\circ$ vertical to more clearly show how the response of the speaker changes as one moves off the reference axis.
Figure 4: Response curves for 10°, 20° & 30° above the 0° vertical reference which is the center of the waveguide.

Figure 5: Response curves for 10°, 20° & 30° below the 0° vertical reference which is the center of the waveguide.
Figure 6: $+10^\circ$ & $-10^\circ$ vertical response normalized to $0^\circ$ vertical reference axis to better show change over the $20^\circ$ vertical listening window.

Figure 7: Horizontal polar response at the indicated frequency. Data is normalized to $0\text{dB}$ and smoothed to $1/3$ octave per convention for polar plots.
Figure 8: Horizontal polar response at the indicated frequency. Data is normalized to 0dB and smoothed to 1/3 octave per convention for polar plots.

Figure 9: Horizontal polar response at the indicated frequency. Data is normalized to 0dB and smoothed to 1/3 octave per convention for polar plots.
Figure 10: Vertical polar response at the indicated frequency. Data is normalized to 0dB and smoothed to 1/3 octave per convention for polar plots.

Figure 11: Vertical polar response at the indicated frequency. Data is normalized to 0dB and smoothed to 1/3 octave per convention for polar plots.
Figure 12: Vertical polar response at the indicated frequency. Data is normalized to 0dB and smoothed to 1/3 octave per convention for polar plots.

Figure 13: The chart shows the -6dB point as a function of frequency and coverage angle.
Figure 14: This screenshot shows the equalization applied to the HF driver after the 1050Hz crossover.