Unexpected Intensity Changes in the Ear Canal During Pitch Shift Experiments N. Szuminsky, A. Tlumak, S. Pratt, S. Shaiman

To examine the effects of pitch-shifted auditory feedback of voice, investigators typically use equipment that is designed for music enthusiasts and audio professionals, such as the Eventide Harmonizer Series. Previous studies that have used equipment from this Series have shown that voice fundamental (F0) responses elicited by pitch shifts often are compensatory. During an experiment in which sound levels in the ear canal were monitored via probe microphone system, unexpected intensity changes with the pitch shift were observed. Results revealed that when using Eventide's ULTRASHIFTER<sup>™</sup> to shift the voice F0, the device produced a time delay in the feedback output, causing a phase shift between the feedback and the primary voice signal. The resulting standing waves in the ear canal consequently produced an unexpected intensity shift. Intensity shifts observed were as high as 6 dB, which potentially could alter the interpretation of previously published results, as 1-2 dB is the smallest intensity-level change that most people can hear.