DYNAMIC RANGE

The EIAJ standard measurement for dynamic range is done by reading THD+N at an input amplitude of –60dB. The measured value is negative, since the distortion level will be down from the fundamental amplitude. Dynamic range is calculated by inverting the polarity of the THD+N reading, and adding 60dB. Theoretical dynamic range performance is limited by resolution, which determines the quantization error level:

Dynamic Range = $6.02n + 1.76$, in dB

n = number of bits of resolution

Given this equation, the theoretical limit for dynamic range for a 16-bit DAC is approximately 98dB. In practice, dynamic range is degraded by nonlinearities and semiconductor noise sources, as well as by actual resolution. Dynamic range is perhaps the most useful figure of merit for an audio DAC, as it indicates the DACs ability to reproduce low level signals. Human hearing is much more sensitive to distortion at very low signal levels than at large amplitudes. Dynamic