High-Fidelity Sound:

An ideal high-fidelity sound system, independent of the nature/scheme/type of such a sound system, should have the following six sonic attributes:

(1) The frequency range (*i.e.*) bandwidth of the sound system should be able to faithfully/accurately reproduce all of the original frequency components in the original recorded sound; the sound spectrum of the reproduced sound should be identical to that of the original recorded sound.

(2) The reproduced sound should be free (insofar as possible) of distortion, inter-modulation distortion and/or transient distortion, as well as any/all types of noise.

(3) The reproduced sound should have loudness and dynamic range equivalent to that of the original recorded sound.

(4) The reproduced sound should not unduly introduce any significant frequency-dependent phase shifts that are not present in the original recorded sound.

(5) The spatial sound pattern/sound "image" of the original sound should be faithfully reproduced.

(6) The frequency-dependent, spatial and temporal reverberation characteristics of the original sound should be faithfully preserved in the reproduced sound.

No real sound system exists that perfectly/fully simultaneously satisfies all six of these sonic attributes – the devil is (always) in the details of everything – *i.e.* all pieces of equipment in the signal path, from the medium that was used for recording the original sound and its accompanying transducer, if any (*e.g.* vinyl LP's, magnetic tape, …), the preamplifier, frequency equalization (*i.e.* tone controls and or graphic equalizer), the power amplifier(s), the loudspeakers (their crossover networks, if any), the details of the design of the speaker enclosures, the placement of the loudspeaker enclosures in the room, the details of the room acoustics and finally, the location of the listener.

Many modern high fidelity sound systems have enough power to reproduce the peak sound levels *e.g.* heard in an actual concert hall, *i.e.* around ~ 100 *dB* and more. However, a home sound system that outputs sound pressure levels of ~ 85 *dB* will in fact sound quite loud in the smaller listening room of a house, as compared to a voluminous concert hall.

Modern high-fidelity sound systems quote very low distortion, inter-modulation and transient distortion figures, as well as impressive signal-to-noise figures, compared those of hi-fi sound equipment manufactured only a couple-few decades ago, when they are operated within their rated output.

The dynamic range in a listening room is limited by the so-called tolerable top level and by the threshold that can be heard above background noise levels, which in a home listening environment may be around ~ 25–30 *dB vs.* ~ 30–35 *dB* in a concert hall.