



J.W. DAVIS & COMPANY

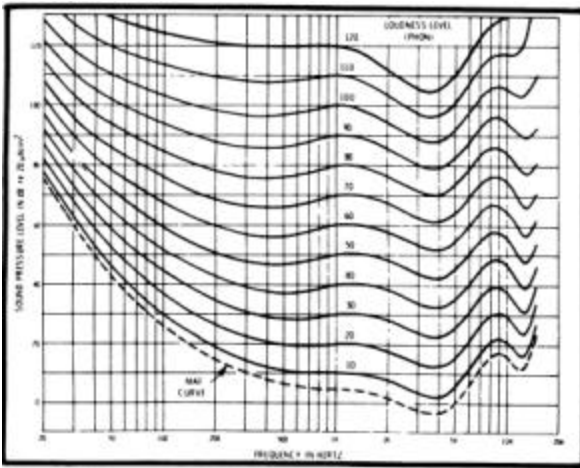
Manufacturer & Distributor of Commercial Audio Equipment Since 1933

FREQUENCY AND AUDIBLE SOUND

Audible sound is produced by sound pressure applied to a listener's ear. This pressure is initiated by a speaker or some other mechanical device that creates a series of pulses of energy that, in turn, cause air molecules to vibrate. As these molecules vibrate, they bump into adjacent molecules causing them to vibrate in a similar manner and "move" through the air. If these vibrations reach a listener's ear with sufficient energy to cause pressure on the eardrum, the listener "hears" an audible sound.

Happily, each pulse of energy contains a series of vibrations that are sustained until the initial energy is ultimately expended in the form of heat. Some of the vibrations cycle at a high rate while some cycle at a slower rate (high or low frequencies). If this did not happen, the listener would hear a very boring monotone.

Unfortunately, listeners do not perceive all of the frequencies contained in each pulse of energy equally. As reference to the graph below shows, the perception of frequencies



below 500 Hz and above 6000 Hz is much less at the more commonly used sound pressure levels. In fact, at the 20 phon loudness level, the listener probably will not hear any sounds below 200 Hz or above 7000 Hz.

Further, as the graph illustrates, the "roll off" is much greater in low frequencies. For example, frequencies below 50 Hz require the intensity to be increased 250,000 times to make them equal in loudness to a reference frequency of 1000

Hz. This is why bass frequencies are the most difficult to make audible, and why special speakers such as subwoofers and tweeters are necessary to actually produce audible low and high frequencies.