

## THE PROBLEM WITH MULTI-BAND COMPRESSION AND MUSIC:

Edgar Villchur, the father of our modern day air-suspended acoustic reflex loudspeakers, wrote some of the earliest articles on multi-band compression. It has been in wide use since the late 1980s and today is the default hearing aid setting for improving a hard of hearing person's ability to hear in noisy locations. With multi-band compression, the amplification for the lower frequency vowel sounds can be set differently than that required for mid-frequency speech sounds, and also for higher frequency consonant sounds.

Despite the ubiquitous and relative success of multi-band compression for hearing aid amplification for hard of hearing people while listening to speech, it can have its drawbacks for music.

A characteristic of multi-band compression is that it does not change the frequency or pitch of a sound. If a musical note is A, such as the one on the second space of the treble clef, its fundamental frequency is exactly 440 Hz. Multi-band compression would make this 440 Hz softer or louder but never change its frequency. Yet, many musical instruments only differ in the intensity or loudness of each of its various harmonics. A violin or an oboe playing A (440 Hz), like the flute, has integer multiples of its harmonics at exactly 880 Hz, 1320 Hz, 1760 Hz, and so on.... So why does a flute sound different than an oboe?

The difference is how loud each of the harmonics are. Boosting up the loudness of some of the harmonics and quieting down some of the other harmonics can easily make one musical instrument sound like another.

Multi-band compression, if not set correctly in order to compensate for a hard of hearing person's hearing loss, can indeed make a flute sound like an oboe, a violin, or any number of other musical instruments.

The following audio file is an "A-B-A" comparison. This means that the first part of the audio file (A) is a flute, the second part (B) is a "modified flute" where only the loudness of the various harmonics are altered, and the third part (A) is the original flute again, for comparison. The "B" middle section sounds a lot like an oboe to me. Oboes are nice, but not when you are expecting to hear a flute. Or maybe it sounds like a violin, and only because the multi-band compression was set incorrectly.

[Flute to Modified flute to Oboe.mp3](#)

***I would like to acknowledge Shaun Chasin, Composer, who created this audio file. More about Shaun can be found at [www.Chasin.ca](http://www.Chasin.ca).***