Peakride Audio Compression

White Paper

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Safe Sound Audio, UK

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Introduction

The design goal of '*peakride*' compression was to have enough speed to catch those fast attack transients but not to strangle the life out of them. We saw so many comments from users of existing compressors that they struggled to bring fast transients, such as vocals, under control, some even resorting to using limiters in series with compressors (actually not a bad idea!), only to complain that their super fast compressors were strangling the vitality of the performance through over-compression.

Experimentation with single side chain compressor designs led to three important findings;

- Fast attack compressors were very desirable for many fast transient audio types but often led to over compression of the source.

- It was quite difficult and very time consuming trying to set optimal attack and release times for many types of audio sources.

- Very long release times were not appropriate for many types of source material including vocals but were often used to disguise poor ripple distortion performance.

Have a look at a typical 'first phrase' vocal waveform below;

The attack time of the initial vocal syllable is very quick so a fast compressor attack time will be necessary to bring some dynamic control to the vocal. If done with a simple fast attack compressor, this is what happens;
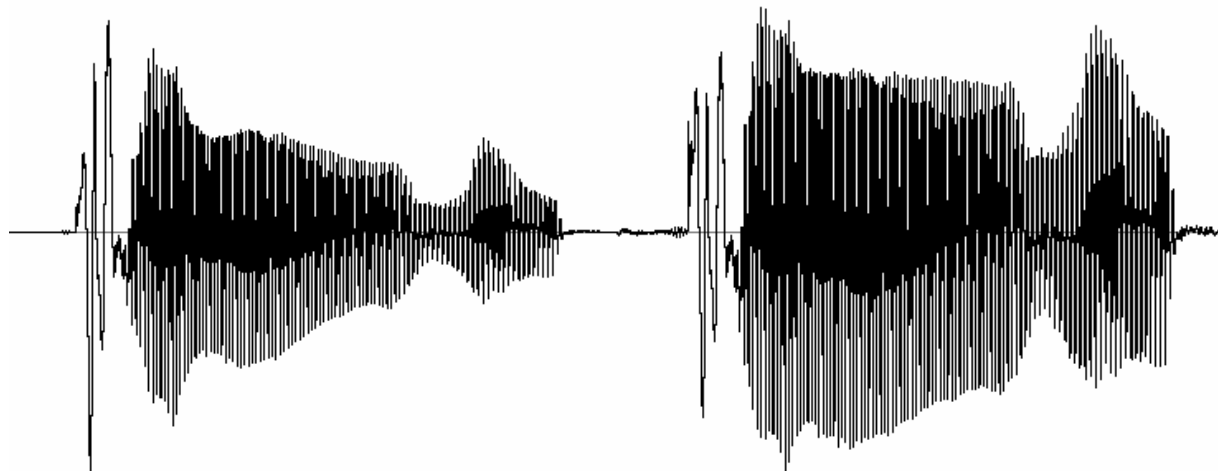
before compression   after compression (with gain make-up)

The first syllable attack is well controlled, but even with a short 100ms release time, the rest of the vocal phrase has been over compressed and most of the dynamic expression of the vocal phrase has been lost. It's a common misconception that percussion instruments have the monopoly on fast attack waveforms; vocal attack times can be staggeringly quick as well.

We tried shortening the release time down as far as 20ms, but now you start to get severe compression pumping, so that the compressor is gain pumping up and down with every vocal syllable. No good at all!

What's really required is a control chain which allows the compressor to 'ride' the crests of the audio so that reaction to fast audio peaks is fast and release from compression matches

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the natural 'smooth' decay of the audio waveform. It has to be capable of fast attack compression without the subsequent over compression shown above.

So when one control side chain won't do the job; use three!
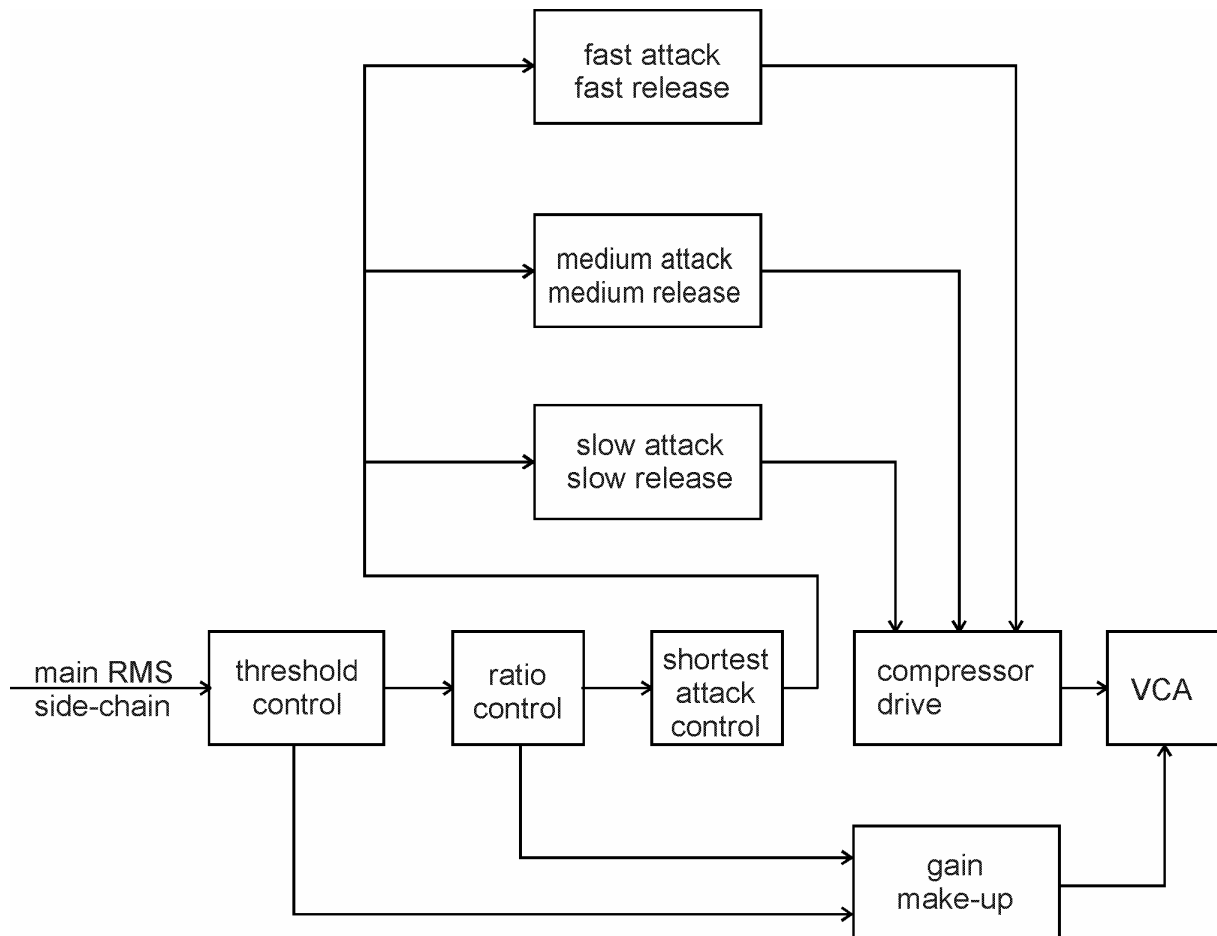
Side-chain 1 : a fast attack, fast release compressor which catches these over excited vocal phrases but recovers very quickly.

Side-chain 2 : a medium attack, medium release compressor which smoothes out the release response of side chain one.

Side-chain 3 : a slow attack, slow release compressor (but not too slow!) to provide very low distortion on sustained vocal phrases which often cause problems due to 'ripple' of the vocal modulating the control chain.

The three side-chains have different ratios and knee characteristics and are mixed together in varying levels of contribution to work in harmony providing a 'peakride' compressor response.

The result is a variable (slightly) soft knee adaptive compressor which provides the following key advantages;

- Fast short vocal transients are well controlled without over compression.

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- A programme related auto variable release time was possible making set up of the compressor much faster and simpler.

- 'Ripple' audio distortion has been almost totally eliminated without very long release times being necessary (slowest release time is only 500ms).

And how does it sound?

Beautifully smooth and very easy to dial in when tracking. *Peakride* evens out levels in a very musical way without robbing the sound of life, so bringing the performance a new energy.

You can benefit from the unique *peakride* compression design in a number of our products available to view and review at www.safesoundaudio.com

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