Multiband Processing

# What is Multiband Processing?

Multiband processing involves taking an audio signal and sending it through a crossover to process different frequency ranges with different settings at the same time.

# Serial Processing

Serial processing involves processing sound through multiple signal processors in series, i.e. one after the other. Every processor at the end of the chain will take its input from the output of the processor before it. This is the typical way that we process signals as inserts. Multiband serial processing is difficult if the plugin does not employ a crossover as every processor down the chain will have not process the frequencies removed earlier in the chain.

# Parallel Processing

Parallel processing involves using aux sends to duplicate a signal and mix it with the original version. The signals are processed in parallel, allowing you to mix and blend various effected versions of the original signal.

# How to create multiple bands manually

Many plugins are being created with multiband functionality, nowadays, but there are plenty that are incapable. In addition, most analog hardware is not designed to process signal with multiple bands. If we want to do multiband processing, we will have to do it manually. This is easily achieved by using Aux sends with a crossover or filter. Passing filters are usually the best type of filter to use as you can define a range that passes through. A few important notes when taking this approach:

* Watch out for phase interactions at the crossover points
* When phase interaction does occur it can add ringing, distortion, or even noise into your signal when summed back together.

# Plugins that can create parallel/serial chains

There exist a number of plugins that can act as parallel/serial chainers. You simply place these on your track as an insert and then load other plugins into the chainer itself. This saves you space on your inserts and saves you from having to create multiple sends and sum them later on. This can occasionally show an increase in CPU performance but that is dependent on the plugin manufacturer.

Example plugins: Blue Cat MB-7 Mixer, Blue Cat PatchWork, Metaplugin, Bidule

# Effects that work well with Multiband

Really, anything other than EQ. When you think about it, EQ is already a multiband effect. Adding an EQ to a multiband processing chain can make sense to further enhance the effect but creating a multiband chain with only EQ’s can cause issues down the line. As a point of clarification, I am referring to EQ used after you’ve used a filter to set the band. The potential for phase issues increase dramatically in this case.

# Reasons to use multiband compression

Most commonly, multiband techniques are centered around compression. This is arguably the most versatile technique in the multiband arsenal. Reasons to use it are widespread and varied but generally center around something that requires compression on specific bands but not as much on others. The most common example here is probably drums, with each instrument behaving differently amplitude wise.

Additionally, this can be useful for instruments that have a timbral change as their amplitude increases. This can most commonly be experienced on vocals. Singers tend to alter their timbre as they increase in volume, in turn increasing in emotion. By using a multiband compressor, we can set certain bands to engage as the amplitude reaches a certain threshold, maintaining an appropriate timbre.

# Specific Technique Examples

* Reamping into multiple amps
* Distorting specific bands
* Compressing various bands on a vocal as amplitude changes
* Controlling ring on drums. As the level increases, compression on the ringing frequencies increases
* Can be used in conjunction with sidechaining to duck specific frequencies
* Sidechained vocals, removing only the offending frequencies
* Taming cymbal spikes
* Locking a vocal in place dynamically and timbrally for a solid pop tone
* Locking bass fundamental tones and allowing higher frequencies to be dynamic
* Inversely, locking brilliance in instruments like acoustic guitars while allowing lower frequencies to be dynamic
* Allowing only certain frequencies into
* Can be used to automate Timbre of a sound
* Can be used to pan various elements of a sound’s timbre
* Delay and Reverb on various bands