DECIMATOR TECHNOLOGY PRIMER

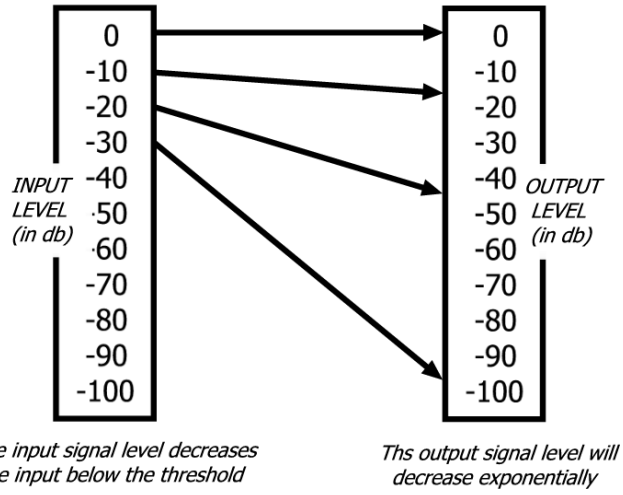
The Decimator Technology Primer is a tool to help answer questions regarding the difference between the Decimator Pedal, Decimator ProRack, Decimator ProRackG and the Decimator ProRackG Stereo Mod. The following Primer should answer most questions about the different units and help you better understand which unit is best for your specific applications.

The Decimator is not a noise gate it is a low level downward expander in the pedal and the combination of low level downward expansion and dynamic filtering in the ProRack, ProRackG and ProRackG Stereo Mod units.

First lets look at what a low level downward expander does!

Low Level Downward Expansion is performed by use of a high quality voltage controlled amplifier controlled by an RMS based audio level detection circuit. The ISP Technologies patented Time Vector Processing circuit varies the release response over a 1000 to 1 ratio and controls the release response of the Downward Expander. The release response will be extremely fast, on the order of 2 milliseconds, if the input signal has a fast decaying envelope and upwards of 2 seconds if the input signal has a slow decaying signal. Downward Expansion takes place when the input signal level drops below the preset threshold which is adjusted by the Threshold control on the unit. For example: looking at the figure below you can see if the threshold is set for 0db an input signal of 0db will produce no expansion. As the input signal drops below 0db downward expansion starts and increases exponentially. The farther the input signal drops below the threshold point the more the expansion ration increases. Note: the graph below shows the response of the Expander with a threshold setting of 0db.

TYPICAL EXPANSION RATIO
with a threshold setting of 0db.

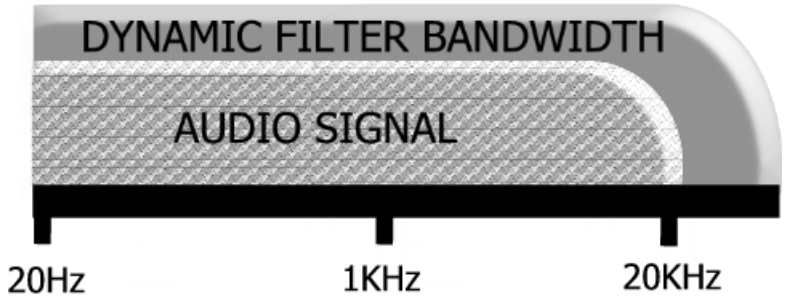


The pedal incorporates this single process of low level downward expansion. The process of low level downward expansion is the most effective process at removing hum and noise picked up by the guitar and is also effective at eliminating the high gain noise and hiss typical with high gain guitar systems.

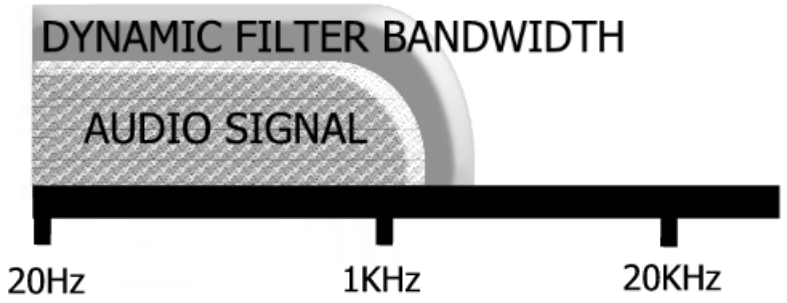
All of the ProRack units also incorporate a second process called dynamically controlled low pass filtering. This means that The Decimator ProRack systems achieve noise reduction by employing two individual noise reduction processes, which work cohesively together to attain superior results. These two processes are:

1. Low Level Downward Expansion
2. Dynamic Low Pass Filtering

Dynamic Low Pass Filtering is done by use of a high quality voltage controlled sliding filter. A frequency sensitive audio level detection circuit incorporating ISP Technologies patented Time Vector Processing circuit controls the dynamic filter. When the audio input signal contains high frequency information the dynamic filter increases in bandwidth to allow the audio signal to pass unaltered and shown in the simplified graph below.



When the high frequency information in the input signal decreases the dynamic filter bandwidth will track the decrease in high frequency and eliminate high frequency noise that remains in the input signal. The simplified graph below shows the dynamic filter response when there is no high frequency audio above 1KHz.

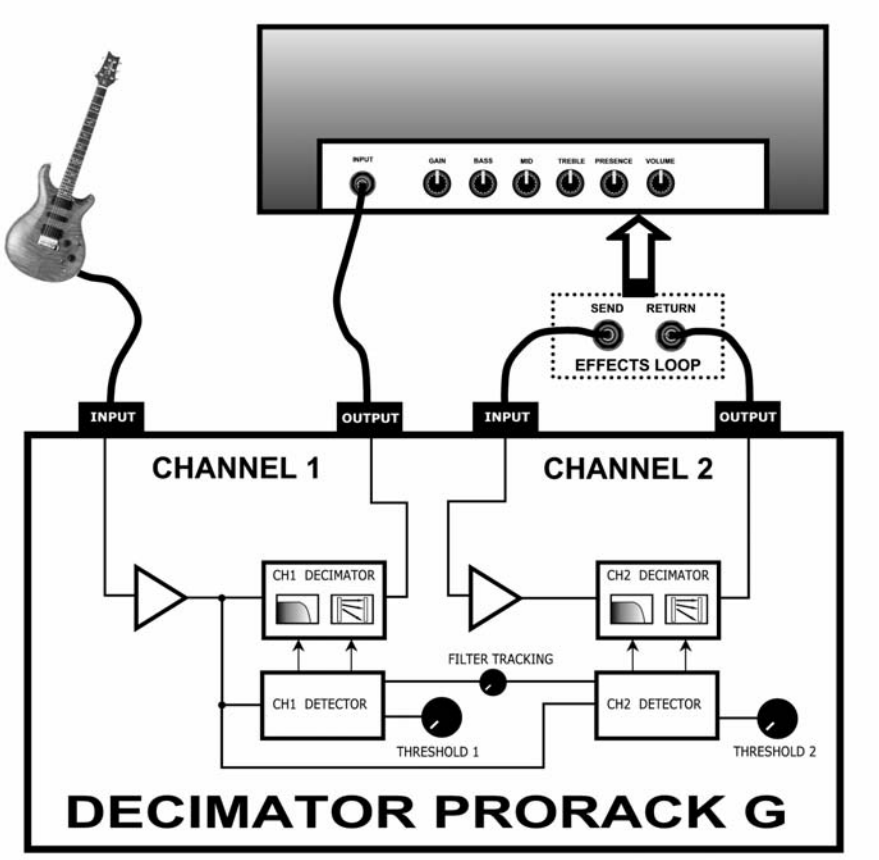


The release time of the dynamic filter is controlled by the Time Vector Processing circuit, which determines the release characteristics of the input signal and automatically varies the release response of the dynamic filter.

The standard ProRack unit offers two fully independent channels (stereo) Decimator blocks with both processes described above. This system was designed mainly for use in live sound and recording applications where two totally independent channels are desired.

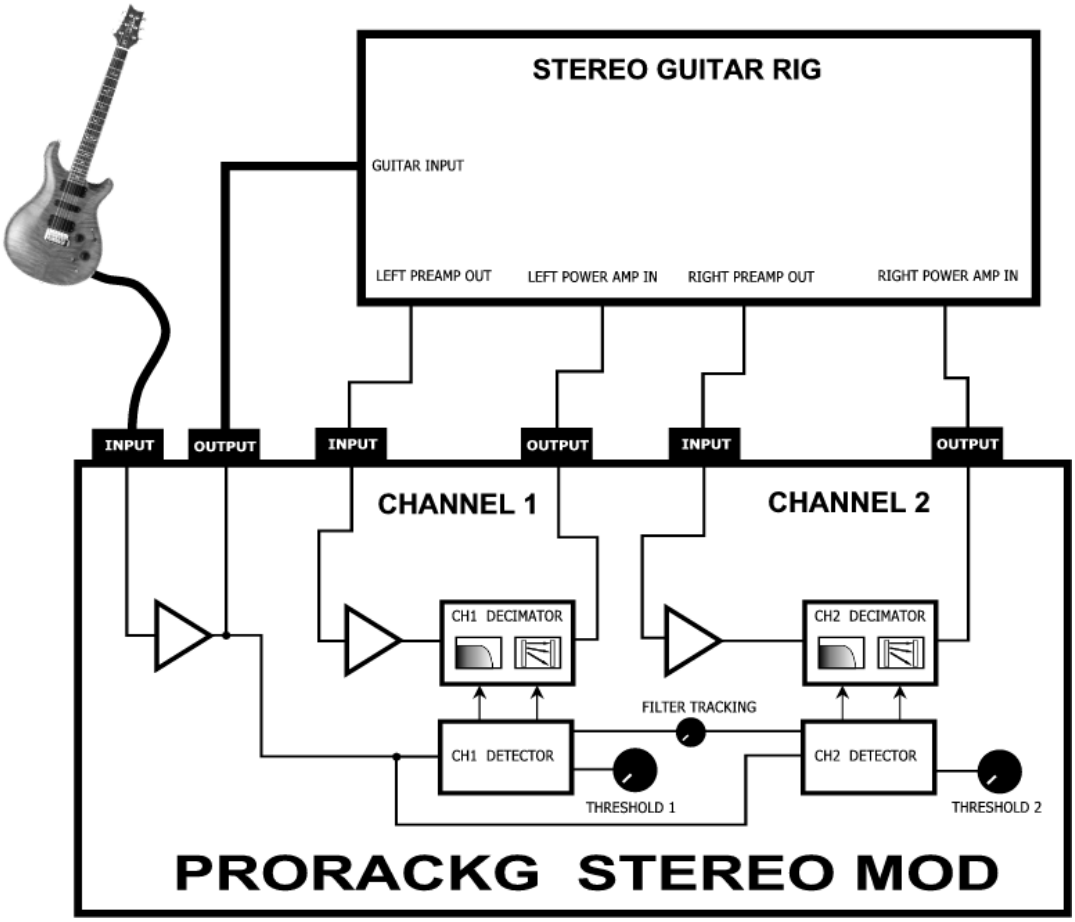
The most effective point to track the guitar signal is right at the output of the guitar itself before any gain or EQ is applied. Most players find inserting the pedal directly between the guitar and input of the guitar amplifier is the best location to eliminate the typical squealing that you get with a very high gain setup. However, the gain noise is not reduced with this configuration since the Decimator will only eliminate the noise that is present at its input. As a result, many players will insert the Decimator pedal in the effects loop of the amplifier to help eliminate the gain noise. This works well but has one drawback, which is that changing from high gain to low gain or clean settings on the amplifier may require switching the pedal off when using the clean channel due to the drop in the background noise. If the threshold is set based on the high amount of gain noise with the high gain or distortion channel this threshold setting will be too high when the clean channel is switched on and will result in a loss of low level signal from the guitar due to the expander operation. To eliminate this problem we developed the Decimator ProRackG.

The Decimator ProRackG block diagram is shown below and is the basis of a second patent pending for the Decimator technology. As can be seen in the diagram below, the guitar input is applied to the input of channel 1 directly however, the buffered output of the guitar is fed to both channel 1 and channel 2 level detectors, which means that both channels control circuitry for both low level downward expansion and dynamic filtering is looking directly at the clean un-altered guitar signal. This allows both channels to directly track the wide dynamic range of the guitar and not the compressed, distorted signal that would appear at the output of the amplifiers effects loop. The ProRackG puts one channel of Decimator between the guitar and the input of the amplifier and a second audio channel in the effects loop of the high gain amplifier. The huge advantage of this is that the second channel will eliminate the gain noise in the effects loop and yet the detectors are controlled from the wide dynamic range of the guitar signal. This allows you to set the threshold of the guitar based on the noise floor of the guitar and control the gain noise in the loop with much more accuracy and far smoother control. The second advantage is that you can now switch from high gain to clean and anywhere in between and never have to adjust the threshold or switch the Decimator out of the signal path. You get the best of both worlds by having a channel of Decimator between the guitar and amplifier input to eliminate noise picked up by the guitar like light noise, RF energy such as AM radio stations, 60 cycle hum and other annoying noises and have the second channel that will eliminate the high gain noise and hum from the amplifier. Still one other major advantage is that the block of Decimator between the guitar and amplifier will virtually eliminate the high gain squealing problem that many players cannot seem to control.



The Decimator ProRackG Stereo Mod was designed for users who need two independent channels of Decimator but still want the advantage of having both channels level detectors track the guitar signal directly allowing the advantages of the Decimator ProRackG but is a true stereo or two channel system.

As can be seen in the diagram below the ProRackG Stereo Mod has an input to connect the guitar directly and a buffered output signal to feed the front of a stereo guitar rig directly while providing two separate audio channels of Decimator that can be inserted in the stereo guitar rig. The ProRackG Stereo Mod was designed for the serious player who is using a stereo guitar rig and needs to inset two separate channels of Decimator between the preamp output and input of a stereo power amplifier. You can see from the diagram below that the guitar signal is buffered and fed to an output jack to connect to the front end of the guitar rig but internal in the ProRackG Stereo Mod the guitar signal is also fed to the input of both channel 1 and channel 2 level detectors. Note: If the rig is using an effects processor it is recommended to connect the effects processor between the output of the ProRackG Stereo Mod and the input of the stereo power amplifier. Some players who are using two different guitar amplifiers also find the ProRackG Stereo Mod to work best for their applications.



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