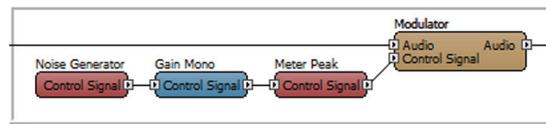


# Creating a Bass Lift Volume Control

This guide will outline a method by which a low frequency boost or cut can be applied to a signal depending on the level of a Gain Fader. One way of achieving this is by controlling the relative levels of the outputs of a Crossover processing object that is dividing the signal into low frequency and high frequency signals. When running at quiet volumes the low frequencies would have a higher relative level. As the volume is increased the low frequencies would increase more slowly in proportion to the high frequency signal. The resultant effect is a bass 'lift' at lower volumes.

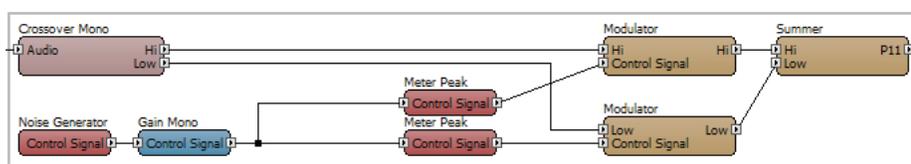
In this circuit we have a Noise Generator feeding a Gain Mono which in turn feeds a Peak Meter and Modulator.



We now have the basic structure of our circuit which provides us with a means to alter the level of an audio signal using a control signal. To understand how the circuit works, we need to look at the Modulator processing object.

The Modulator has two inputs, the first input requires an AC signal and is for the audio signal you want to control. The second input requires a DC control signal which will vary the level of the audio signal at the Modulator's output. Using an AC signal on the second input will result in severe distortion. A DC control signal can be produced using a Meter object which has the "Enable Control Output" option set to "On" in the Properties Pane. The control signal produced by the Meter object will be the DC value of the incoming AC audio signal. (This signal must only be used in conjunction with specific processing objects and must never be wired to an analogue output.) The control circuit starts with a Noise Generator followed by a Mono Gain object. In this case, you can think of the modulator as acting like a VCA. As the level of the Mono Gain is increased, the Modulator will turn up its output volume.

In the next circuit a Crossover, Modulator, Meter and Summer are added to provide volume control for two frequency ranges.

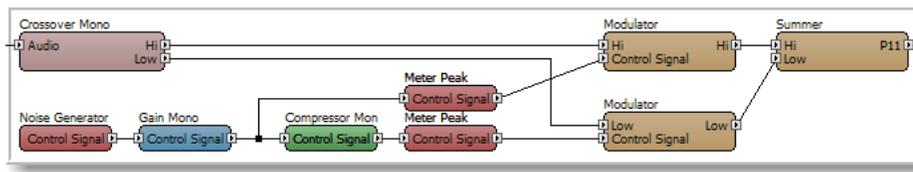




# Creating a Bass Lift Volume Control

At present, the level of the control signal will alter both low frequency and high frequency signals by the same amount. We can now process the control signal without causing degradation to the audio signal.

In the circuit below, a Compressor has been added to the control signal which affects the level of the low frequency audio signal. By adding a Compressor to one of the control signals we can alter its gain characteristics in relation to the uncompressed control signal



When the Gain object is turned up, the control signal going to the Modulator for the low frequencies will increase more slowly than the control signal going to the Modulator for the high frequency signal.

The parameter values of the Compressor must now be adjusted to set the relative balance between the low frequency and high frequency signals.

- \* Set the output Level of the Noise Generator to +3dB
- \* Start with the Gain object at a low level. This represents the “quiet” volume setting
- \* Set the Compressor’s Threshold to -30dB and Ratio to 1.02:1 (lowest setting)
- \* Adjust the Crossover outputs so that the low frequency and high frequency signals sound correctly balanced
- \* Change the level of the Gain object to a high level, representing the “loud” volume - the low frequency will temporarily sound too loud in relation to the high frequency signal
- \* Turn up the Ratio on the Compressor until the balance between the low frequency and the high frequency signal is once again correctly balanced

The point at which the control signal compression starts to take place can be adjusted by altering the Compressor’s Threshold level or the level of the Noise Generator. You may need to change the threshold depending on your definitions of quiet and loud. You can also adjust the output level of the noise generator.

Remember, we’re compressing the control signal, not the audio. All we’re doing to the audio signal is changing the way that the volume control responds. There won’t be any compression of the audio signal and you won’t hear any squashing or other artifacts.