TECH LIBRARY

Dynamic Equalisation Part 2

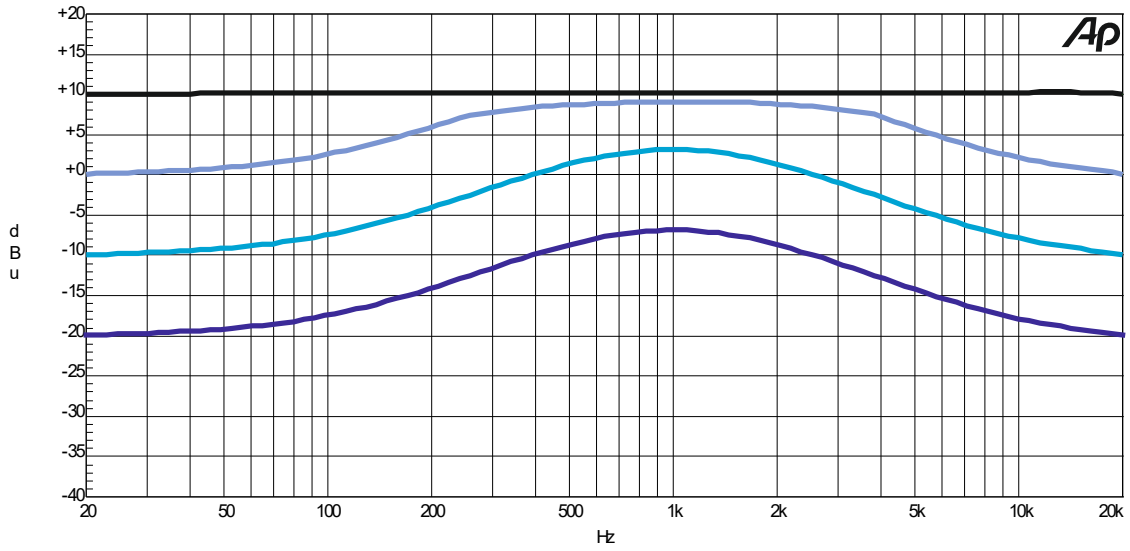
How it works and how to use it to your advantage

What is Dynamic Equalisation?

Dynamic Equalisation (DEQ) is essentially a compressor or expander that can be set to respond to and adjust the gain automatically over a certain range of frequencies. Its behaviour is dependent on the mode chosen – two of these are relatively "traditional", as discussed in part 1 of this document, whilst the two modes explained here offer the possibility to turn the normal action of compressors and expanders on their head introducing innovative adaptive control of the program material.

"Boost Below" Mode

This mode operates in a slightly unconventional manner insofar as behaving as an 'upwards expander', as opposed to the more traditional 'downwards expander'. What this means is that as the signal drops below the threshold, the selected band of frequencies will be progressively boosted in relation to the rest of the spectrum, offering a perceived 'lift' in the band. Consider the example below where the threshold is set to +10dB, and the selected frequency band is centred around 1kHz, with a 'Q' of 1.0.



Signals above the threshold pass unaltered but, as the signal drops below the threshold, frequencies around the 1kHz region will be progressively boosted (or expanded). How much boost is applied will depend on the ratio set and how far below the threshold the signal actually is.

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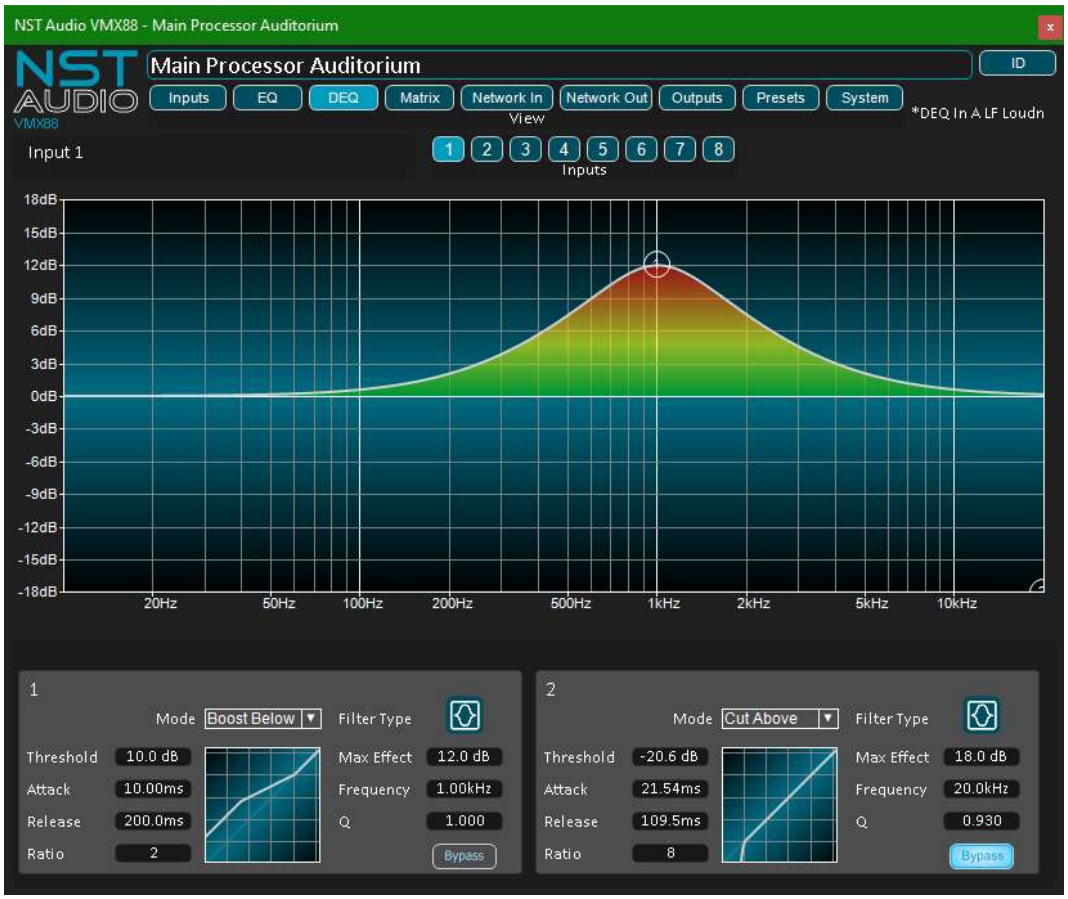
How It Looks In D-Net

As this mode takes action as the signal drops below the chosen threshold, in the absence of signal it will show maximum gain boost as defined by the Max Effect level. The mini I/O graph in the parameter section shows that when the signal drops below the Threshold (the upper knee) the gain will be increased by an amount determined by the Ratio. Below the level of the [Threshold – Max Efffect] the gain will not further increase so the graph shows a 1:1 ratio once more. The Max Effect therefore controls not just the high point on the dynamic curve, it also moves the lower knee of the I/O graph.



Adjustment of the Ratio will affect the steepness of the middle section of the graph with higher ratios resulting in a more pronounced (steeper) change. Adjustment of the Attack and Release times will affect the speed of response of the gain boost, and this is reflected in the dynamic nature of the curve fill.

Uses of "Boost Below" Mode

One of the best uses of this mode is in the area of voice levelling and clarification. Placing the filter at about 700Hz (lower to nearer 600Hz for men, up to 800Hz for women/children) with a wide 'Q' – typically 0.7, a ratio of 2:1, a maximum gain of 12dB, attack 10mS and release 100mS. This will ensure that quiet talkers will have their vocal range boosted, without bringing up system noise or microphone handling noise/room rumble.

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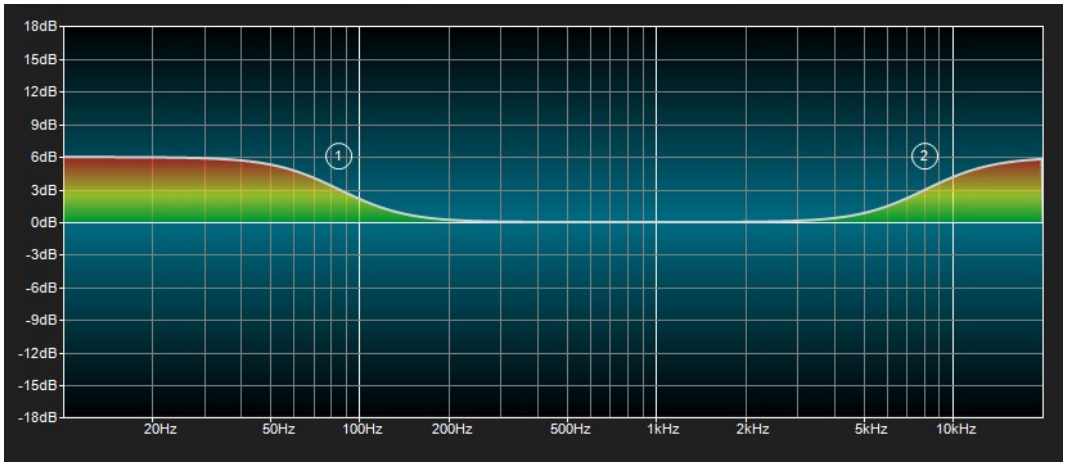
Also consider using two bands set to high and low shelves with Max Effect at 6dB and a high threshold and slow attack and release to boost HF and LF at low levels - functioning as an automatic “Loudness” control.

Signals above the threshold will pass through unaltered, but as the level drops, a limited amount of boost will be applied to achieve a classic “Loudness” compensated curve.



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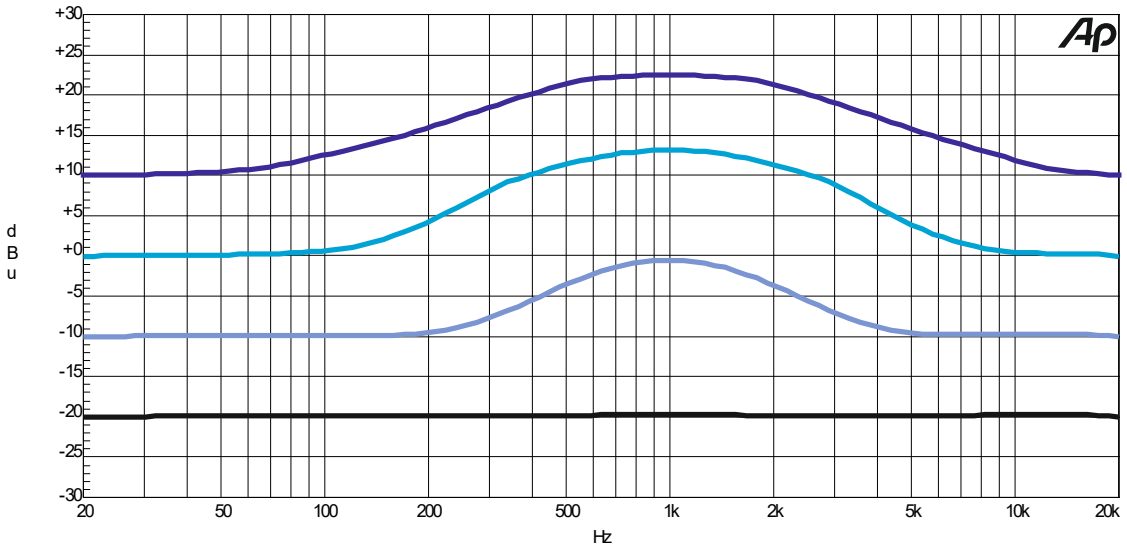
“Boost Above” Mode

Arguably the most “dangerous” (!), this is the other unconventional mode of operation, offering upward expansion, where the signal is boosted once it reaches the threshold. The example below shows that 1kHz filter again, this time with the threshold at -20dB. As the signal rises above the threshold it is progressively boosted around the 1kHz region.



Uses of “Boost Above” Mode

This mode is more useful that it might first appear – the ability to add EQ only at higher signal levels allows some very effective emphasis of certain parts of the spectrum to be added, without the side effect of a permanent audible peak.

Adding some ‘top end sparkle’ – try picking out high-hats and cymbals with a filter at 12kHz , ‘Q’ of 1 Octave, and fast attack and release, typically 5mS and 25mS. This gives a significant boost to the top end, without bringing up noise in the absence of any high frequency content.

Similarly, ‘punch’ can be re-introduced to a lacklustre bass drum by setting the filter to about 80Hz and slowing the attack to 49mS and the release to 100mS. As the bass drum causes the EQ only to be applied on peaks, there is no additional muddiness added to the bottom end of the spectrum.

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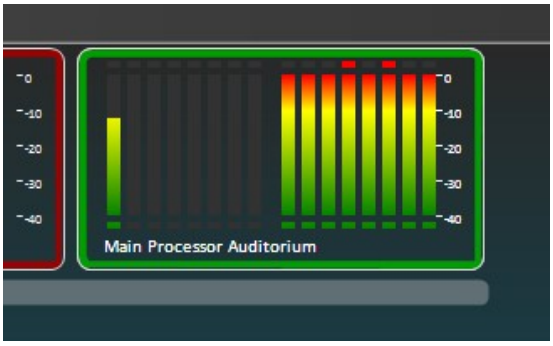
How It Looks In D-Net

It's recommended to keep the Max Effect and Ratio parameters set to low values (6dB and 2:1) so as to avoid sudden peaks in output! As this mode introduces additional gain when the signal goes above the Threshold, in the absence of signal, the white curve shows the area that will be boosted and the Max Effect will control this highest gain.

As the signal crosses the threshold, the curve will fill in at what will be an accelerated rate (!) so if the threshold is set to and already high value, remember that it will be quite easy to reach a very high output level on the processor so monitor the IO meters carefully!



What About The Other Two Modes?

The slightly more conventional nature of the Cut Below and Cut Above modes is covered in Part 1 of this Tech Library article. Find out how they can be used as corrective tools instead of creative tools...

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