

IQ4_{gui}

Dynamic EQ



A VST plug for Windows PCs only (you will need a VST compatible host program.)

Designed by platinumears aka: Dan Worrall, using Jeff McLintock's Synthedit software.

Graphics by Eric Langou <http://www.novaflash.com>

Thanks to Chris Kerry, David Haupt and Marc Lindahl for the excellent modules.

Imagine a standard compressor with a filter inserted in the side-chain, so that it only responds to certain frequencies. Now imagine that instead of controlling the overall gain of the signal, it only controls the volume of specific frequencies.. you just discovered dynamic EQ!

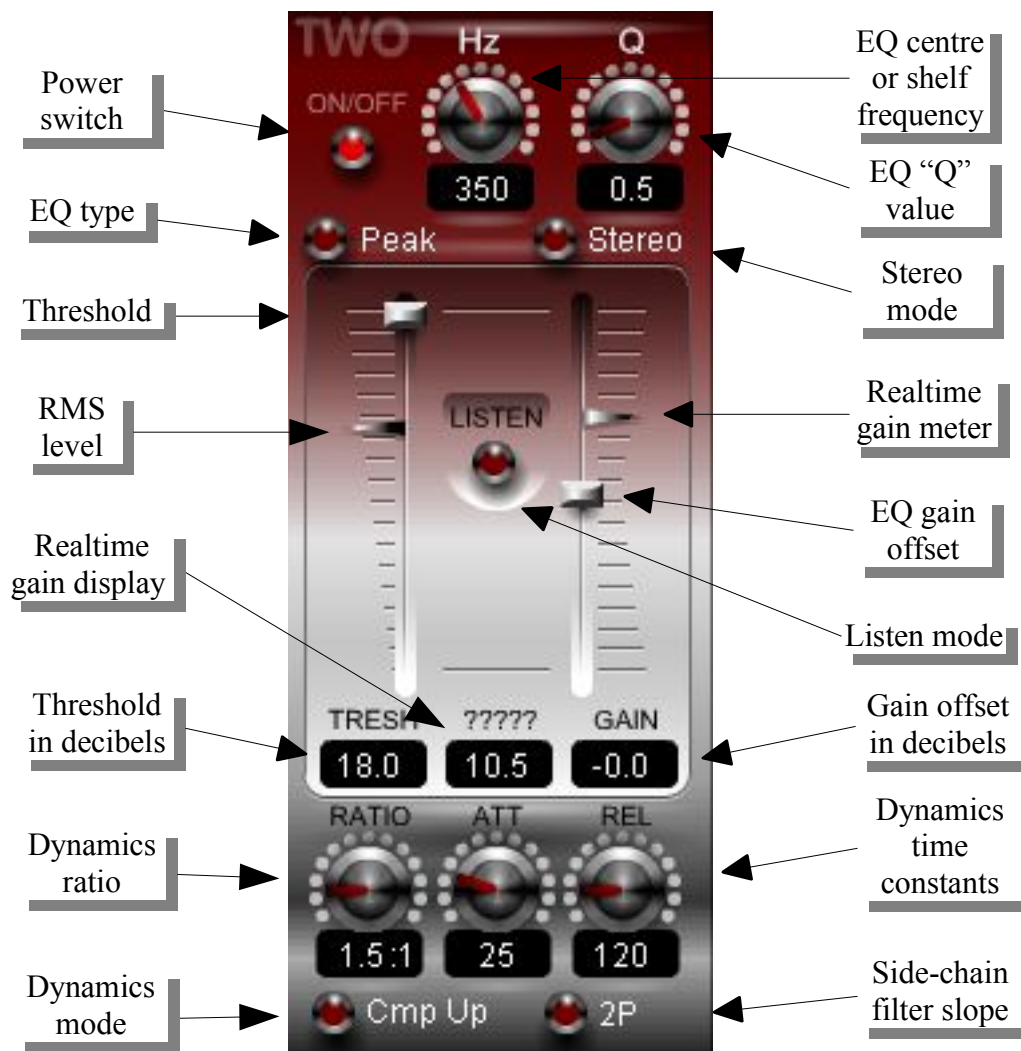
In other words, it can compress or expand specific frequencies in a similar manner to multi-band compression (but with a very different character) or it can de-ess, or perform more esoteric functions such as ducking one frequency when another is prominent.

You may find it easier to imagine the process as an automatic EQ, which can be used to cut a certain frequency *only* when it becomes a problem, or apply a boost only when that region isn't already loud enough.

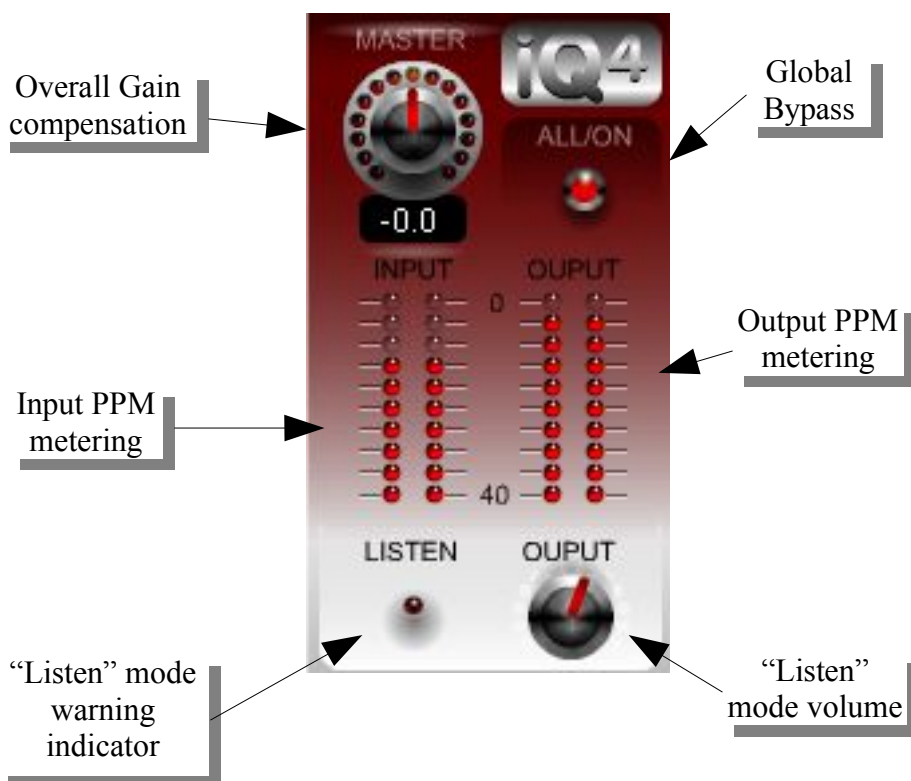
Four bands are available (I rarely use more than two at a time myself: unused bands can be turned off to free up CPU resources) Each band can be set to peaking or low / high shelving types, and they all have identical frequency ranges. (Hold the Ctrl key down while tweaking to make fine adjustments.)

While the audio signal path passes through all four EQs in series (obviously) the side-chain filters are configured in parallel and are all fed from the main input, so changes to band one for example, will not affect the amount of gain reduction or expansion applied by any other bands.

I don't really approve of presets for compressors, and I definitely don't use presets for EQ's! I have however, relented enough to provide a few basic examples to get you started. I would encourage you to, at the very least, adjust the threshold levels to suit the material..



- **Power Switch:** This simply bypasses the band and frees up some cpu cycles
- **EQ Type:** Choose between high or low shelf slopes, or a peaking type curve.
- **Threshold:** Sets the level at which dynamic EQ changes are applied..
- **RMS Level:** Provides a visual indication of the side-chain RMS levels.
- **Realtime gain display:** Provides a numeric readout of current EQ gain in decibels.
- **Dynamics Ratio:** Controls how much gain change takes place when the threshold is passed.
- **Dynamics Mode:** Choose between downwards compression, upwards compression, downwards expansion, or upwards expansion. (See below.)
- **EQ Frequency:** Sets the shelf or centre frequency of the EQ processing.
- **EQ “Q”:** Sets the EQ's “Q” or bandwidth. (how much adjacent frequencies are affected.)
- **Stereo Mode:** Choose whether the mid, the side, or both channels are processed. (See below.)
- **Realtime Gain Meter:** Provides a visual indication of dynamic EQ changes.
- **EQ Gain Offset:** Applies a static EQ gain offset (like a compressor's make-up gain).
- **Listen Mode:** Allows the side-chain filtering to be monitored audibly.
- **Dynamics Time Constants:** RMS detection attack and release times, in ms.
- **Side-Chain Filter Slope:** Choose between 2 pole or 4 pole filtering for the side-chain.



- **Overall Gain:** This would normally be used to compensate for gain changes caused by the EQ sections, so that you are not fooled by volume differences when bypassing the process.
- **Global Bypass:** is used to compare the treated signal with the original.
- **Input & Output PPM metering:** Do I really need to explain that?
- **Listen Mode Warning:** is just to remind you that one or more bands are in "Listen" mode.
- **Listen Mode Volume:** has no effect on the EQ signal path; it just allows the side-chain to be monitored at appropriate levels.



- **Filter Cutoff or Centre Frequency:** Allows the filter frequency to be adjusted independently.
- **Filter Q or Bandwidth:** Allows the filter "Q" to be adjusted independently.
- **Link / Free Mode:** If linked, the side-chain filters share the same values as the EQ for that band.
- **Side-Chain Selection:** Choose which of the four side-chains to edit.

Dynamics Modes:

Four types of dynamics processing are available:

- **Downwards Compression (Cmp Dwn):** This is the type of compression most of you will be familiar with; when the side-chain RMS levels exceed the threshold, the EQ gain is reduced according to the ratio setting.
- **Upwards Compression (Cmp Up):** The mirror image of the usual type, in this mode the EQ gain is *increased* according to the ratio setting, when the RMS levels drop *below* the threshold.

NB: Both compression modes will *reduce* the dynamic range of your source material.

- **Downwards Expansion (Exp Dwn):** In this mode, the EQ gain is reduced according to the ratio setting when the RMS levels drop below the threshold.
- **Upwards Expansion (Exp Up):** The EQ gain is increased according to the ratio setting when the RMS levels exceed the threshold.

NB: Both expansion modes will *increase* the dynamic range of your source material.

Warning: Upwards compression and downwards expansion are both easily capable of producing extreme EQ settings when the side-chain levels drop low. In order to avoid destroying the first transient of your material as the dynamics section recovers from these extreme cuts or boosts, I have implemented a safety measure: *When the levels for any particular band drop below -60db (ie: off the bottom of the scale), the dynamics processing gently ramps back to unity with a release time of 4 seconds. When the levels rise back up above -60db the dynamics ramp back in with a 1 ms rise time.* While this cures the problem with sudden starts, it is still possible to destroy fades or reverb decays with careless settings.. in extreme cases you may need to automate the threshold or ratio to avoid this.

Mid / Side Processing:

Mid-side stereo mic'ing (also known as “sum & difference”) is a popular technique in classical recording, as it provides great control over stereo width while guaranteeing perfect mono compatibility:

The source is mic'ed as if in mono (usually, but not necessarily, with a cardioid mic) while another mic with a figure of eight pattern is positioned close to the first, at a perpendicular angle so that its sensitive lobes point out to the sides, and its side null is angled towards the source.

The signal from the figure of eight mic (the “side” or “difference” signal) is panned hard in one direction, while a reversed polarity version of the same signal is mixed in at the same level, but panned hard in the opposite direction. In other words, one channel of a conventional stereo pair is created by *summing* the mid and side signals, while the other is created by *subtracting* the side from the mid. The level of the side signals determines the stereo width.

Any conventional stereo signal can be converted to mid-side stereo, and back again, with no loss of information!

IQ4 converts incoming audio to mid-side stereo, giving you the choice to restrict your processing to either centrally panned signals (Mid), or just the stereo component (Side) or both, for conventional stereo.

Suggested Uses:

Channel Insert:

In situations where you would ordinarily use separate compression and EQ.

Eg; A bass guitar channel may typically need to be compressed fairly heavily, then boosted slightly at 80Hz for extra weight, with maybe a little more EQ cut in the low midrange. When fitting it into the mix it may also become necessary to boost 800Hz a little for definition and clarity.

Using a dynamic EQ however, it is possible to compress the 80Hz and 800Hz regions independently, while setting a low-mid cut that increases in proportion to the low mid content, but remains flat when not needed. If set up correctly this can achieve the same weight and definition as the more traditional approach, while retaining more of the original character of the instrument.

I have also provided a couple of De-Ess presets.. which you will need to adjust to match the level and frequency of your problem sibilance. (Particularly when using the peaking version which only ducks a narrow band rather than all the treble)

Group Insert:

In situations where two or more instruments are competing for the same frequencies.

Eg, The classic situation where you want both the kick drum *and* the bass to have lots of weight!

Sub-grouping the bass with the kick in order to compress them together is not a new trick, but using dynamic EQ instead of a full band compressor allows the effects to be restricted to the bass frequencies where the problem lies. ie; you can set up a low frequency boost which automatically “flattens” itself on every kick drum.

This will increase the apparent level of the bass.. but the kick should still thump! If you get the time constants right, the brain will interpret the ducking of the low frequencies as the natural effects of something even bigger happening to mask them.

Mix Buss Insert / Pre-Mastering:

As an alternative to multi-band compression, or static EQ, or for stereo width manipulation

Setting all four bands to compress sections of the whole frequency range can provide similar dramatic loudness increases as multi-band compression, but with a somewhat different flavour.

One way in which it is *very* similar to multi-band compression however, is that **it makes it easy to completely ruin a good mix!** I want to emphasise that, as the effects of overdoing things can be easy to miss with tired ears, bad monitors, or simply a lack of perspective from getting too close to the mix. Worse still, to untrained ears the music will not sound “over compressed” but will simply be irritating and will make your listeners want to turn their stereo down.. which is probably not the effect you want!

Having said that, it *is* possible to tighten or warm up the bass end of a mix with some low shelving compression, or to add a glossy sheen by compressing just the high frequencies, or to tame a troublesome midrange frequency with a peaking cut when it gets too loud.

Mid-side processing allows control of just the sum or difference channels, so processing can be restricted to only signals that are mono centred, or only signals that are panned to the sides.

Eg: boosting a rock mix at 120Hz in the mid channel may predominantly affect a centrally panned bass guitar, while the same boost applied to the side channel may bring out and widen the stereo guitars.

Creative Audio Mangling:

To get bits of your loops pumping in time to other bits!

No rules for this one.. do whatever sounds good, and have fun!