OctoPre MkII Dynamic: The Compressor Circuit

AN INTERVIEW WITH DESIGNER ROB JENKINS

From the outside, the OctoPre MkII Dynamic is a very simple device: Eight preamps, each with single-dial compression, generous metering, digital i/o, and all within a 1U rack. But under the hood, particular attention has been paid to the compressor circuitry, to ensure the OctoPre MkII Dynamic is best in class. We caught up with Focusrite's Director of Product Strategy, Rob Jenkins, to find out what's going on inside.

First of all, can you briefly sum up the OctoPre MkII Dynamic?

RJ: In a nutshell, the OctoPre MkII Dynamic is an eight-channel mic pre, with a single-dial VCA compressor on each of the channels. Turning the 'compress' dial clockwise decreases the threshold, and increases the makeup gain, the result of which is a sound that gets progressively more compressed but retains a good output level.

The compressor has two modes: normal and 'more', which let you change the behaviour of the compressor to suit different instruments. Both modes use a soft-knee progressive compression curve, modelled on the properties of the Red 3 compressor, and feature fixed Attack time of 1.2 ms and Release time of 28ms.

The original, silver-faced OctoPre has become a firm favourite among recording professionals. What distinguishes the OctoPre MkII Dynamic from the original version?

RJ: The original OctoPre used an opto for controlling the gain of the compressor. Characteristically, optos can have an inherently effected sound, because the speed of the attack and release are hard to control. Used heavily, the opto's attack becomes dominant and the compression is dramatic, which is not ideal for recording.

With the OctoPre MkII Dynamic, we used a VCA over the opto because it's faster, and we made it sound like the Red 3 compressor by using a similar RMS side-chain, which means it produces a control voltage relative to the average level, giving a more natural-sounding compression.

The original OctoPre also featured two simultaneous side-chains that were summed together: a limiter sidechain and a compressor sidechain. OctoPre MkII Dynamic's dynamic circuit doesn't feature this limiting sidechain because the compressor in this design is much faster. Opto compressors are inherently slow at catching fast transients so we had to include a limiter to get the amount of required level reduction.

Without a limiter, how did you make sure the output doesn't clip?

RJ: The unit has been designed with clip-prevention in mind, but not at the expense of audio quality, hence the lack of a limiter, which Focusrite wanted to avoid if at all possible. To achieve this, the theoretical maximum level of a microphone was calculated, and the mic pre was designed with this in mind so as not to clip with this level present, set to minimum gain. As a result, the mic pre won't clip, even with a high output level mic right up close to a snare drum (the mic input will accept signal levels up to +16dBu from a microphone). The ADC input is also quite tolerant to small incursions over the 0dBFS (digital full scale) point.

So, with the mic pre design, and a tolerant ADC, once compression has been applied, the chances of clipping are minimal.

One of the remarkable features of the OctoPre MkII Dynamic's compressor is its similarity to the Focusrite Red 3, used by many professional facilities as a go-to stereo compressor. To develop the characteristics of the new OctoPre MkII Dynamics's compressors, Rob and his team tuned the circuit by ear, as he explains:

RJ: Bass guitar and drums were put through a Red 3 compressor, and the threshold, ratio, attack and release envelopes were modified until we were happy with the sound. These settings were then applied to the new VCA circuit where the soft knee and ratio curve had been copied. Then we listened again to ensure that they operated as you would expect.

The Red 3 is well known and loved for its sympathetic approach to compression, it's not regarded as an 'effect' compressor. But with the OctoPre MkII Dynamic's More button, found on each compressor, you can bring a bit of aggression to your sound. Rob elaborates...

RJ: The More button doubles the ratio from 2:1 to 4:1 and shifts the threshold range, so you have more sensitivity on control. The threshold is closed down, working across a smaller range, as you're applying threshold control over a much louder signal. This is most likely to be applied to the bass drum and snare, and is unlikely to be applied to signal with a long sustain, like cymbals.

So how do you, as the designer, envisage the OctoPre MkII Dynamic being used?

RJ: Well, it has high-quality preamps with lots of gain and dynamic range, and recording compressors on each channel. These enable users to achieve an average signal that is consistently loud. You're going in quick and getting out quick to achieve a louder overall volume whilst remaining natural. It's a gentle compressor. So I can see it being used in the studio, but also in live situations. With its mic pre and compression combination, you can get natural but loud signals into the desk.

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