**Quilcom Rex Duck**



**Design**

The concept of Ring Mod Side Chaining (RMSC) has become much talked about since Renoise introduced it in 2022. Even though there are various free plugins for this, and some DAWs can be configured for it, I fancied making one myself and introducing an idea I had to maintain the fast response while reducing the distortion created by the technique. Plus, I don’t expect you to open an account, install a download manager and give me your contact details! The plugin features the original system and my system, so you can experiment and choose what you prefer. Also, you can adjust it to give the classic pumping effect should you wish to.

The original idea was to take a side chain input (kick), *full-wave* rectify it and make the result negative-going. This control signal then fed into a ring modulator input. The other input on the ring modulator had the bass signal. Because the control signal was unipolar, this was not true ring modulation (4 quadrant ac) but simply a gain control element (2 quadrant dc). The negative-going control signal therefore ducked (reduced) the bass signal at sample rate.

Of course, a kick waveform produces a wildly fluctuating rectified signal, so this imposed a lot of distortion on the bass which was most apparent during the initial attack of the kick. Some liked this “crunch” sound and others didn’t, depending especially on the genre of music being created.

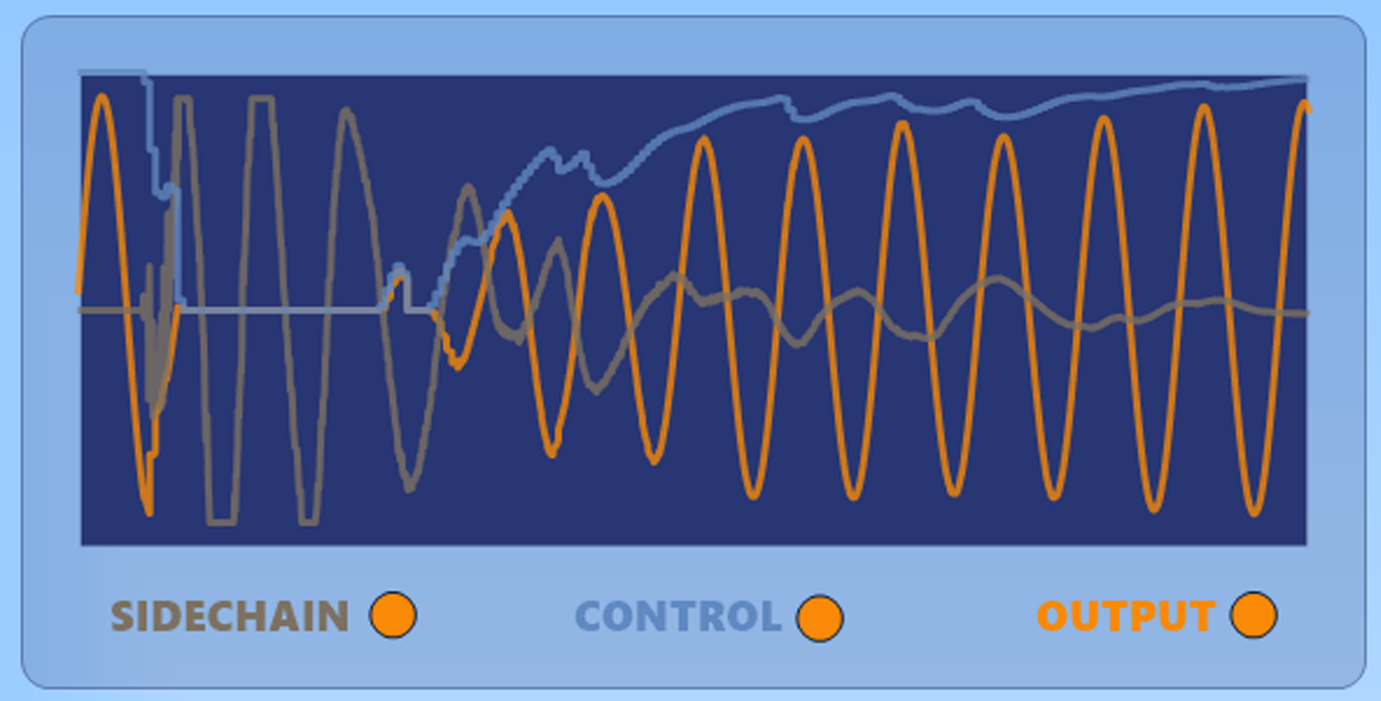
I had an idea to maintain the fast response but reduce the distortion. An envelope follower will have a response time for attack and decay which, when used alone in a ducker, would cause some degree of response latency and “pumping”. The DSP in my Rex system includes the rectifier and also a fast rms envelope follower. The control signal is then the *highest* level of the two for any given sample. That gives you the fast response of the initial kick’s attack, and when the waveform falls momentarily below the current envelope follower’s, the envelope follower’s output is used. This means the envelope follower is only used to “fill in the gaps” produced by the rectifier’s output. The control signal is then inverted, so when no kick is present, the gain is unity.

**In use**

The plugin is curated for a bass signal to be ducked by a kick, but it should work with other signals. The signal path is stereo with mono-summed side chain processing affecting both left and right channels equally.

Inputs 1 and 2 are the main (bass) input and inputs 3 and 4 are for the sidechain signal (kick). Both are dc coupled. The actual bass signal *from the plugin output only* should be routed to the Master channel. Your kick signal (or whatever) should be routed to inputs 3 and 4, ideally sourced from pre-fader. It should also be routed to the Master channel so you can hear it!

**Scope**



The 3-channel storage scope is provided to aid visualisation of the signals. To freeze the display just click it. A red pause marker will appear. Click anywhere again to make it live.

The scope is triggered when the control signal drops below 0.5. This means that a low-level kick signal won’t update the traces. The scope’s inputs are all delayed by 10mS so you can see the start of the ducking action.

The traces can be turned off and on with the orange LED buttons, but the display won’t update until a new trigger arrives.

**SIDECHAIN** (pale brown) shows the sidechain (kick) input waveform.

**CONTROL** (pale blue) shows the generated control signal feeding the gain element. It’s limited to zero at the centre of the display.

**OUTPUT** (orange) show the signal appearing at the plugin’s output (converted to mono just for the scope).

**Main controls**



The **TYPE** selector chooses between **RECT** (original) and **REX** (my system). You can use the arrows to quickly switch the **TYPE**.

The **LISTEN** selector allows you to hear (and output) from 4 different points:

* **OUTPUT** is the processed signal sent to the DAW’s Master channel.
* **SIDECHAIN** is the audio *input* applied inputs 3 and 4.
* **CONTROL** is the control signal applied to the gain element, so you hear the modulation itself.
* **OUTPUT + SIDE** is for hearing the processed signal and the incoming sidechain signal together for evaluation.

For normal use leave it on **OUTPUT**.

Note: *You’ll need to solo the bass track which is running the plugin to hear the sounds from the* ***LISTEN*** *system. Otherwise, the sounds will be masked by the mix.*

The **RANGE** knob adjusts the gain of the signal going into the side chain processor. It’s summed to mono for processing. Double-click **RANGE** for the default of 0.5. If you increase this adjustment, the ducked period will increase and any low-level residual signals will be cut, because they go below zero. If the ducked period is more extended, you’ll get a classic pumping effect on the bass because the ducked period will extend beyond the initial decay of the kick.

The **DRY – WET** knob provides a means to introduce the incoming bass signal into the main processed signal. This can soften the ducking effect. When fully dry there’s no ducking. For normal use, keep it fully wet and reduce it if the ducking is too extreme.

**VOLUME**



The master output **VOLUME** control features stereo bar graphs. These indicate average peak values. If the output goes even briefly beyond +/-1 the centre will turn red for 1 second to indicate clipping. This is for indication only, so please rely on your DAW’s metering system if you need accuracy.