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# Side-chaining and Key Inputs: Pump Up Your Tracks

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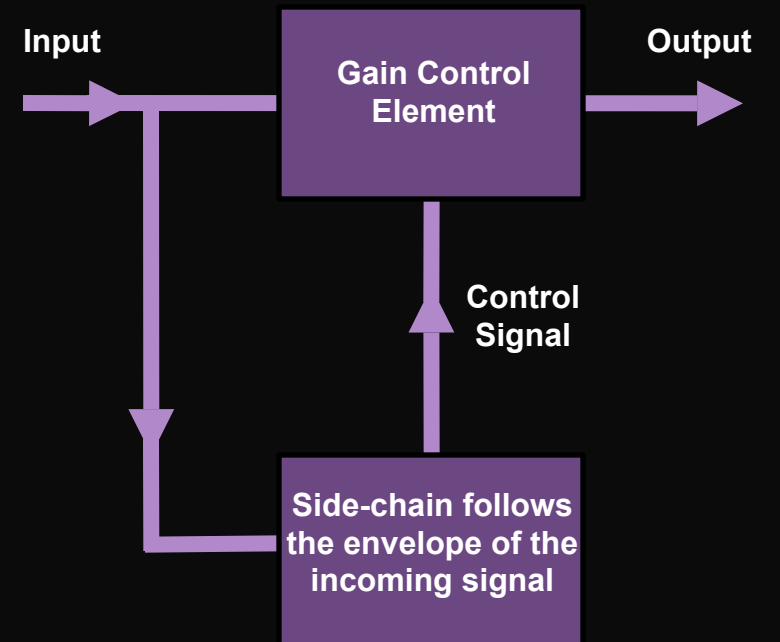
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# Side-chaining Explained

The use of "Side-chaining" has become an essential tool in modern music production, particularly in beat-driven electronic-based music such as EDM and hip-hop. Fans of these genres will undoubtedly be already familiar with the effects this technique produces– the feeling of a perfectly balanced "808" kick drum sound or the "pumping" sensation associated with heavy electro house... but how exactly are these effects achieved? And what the heck is a side-chain anyway?

In most dynamic processors such as compressors and gates, the side-chain is the part of the circuitry that monitors the input level of the unit. The side-chain follows the envelope of the input signal and sends a control signal based on the settings dialed in by the user (ratio, threshold, attack, release) to the gain control element, like a mix engineer making adjustments to faders based on the sound coming over the monitors. Some processors include the option of applying a high- or low-pass filter to the signal before it reaches the side-chain, which doesn't affect the tonality of the main signal but does affect how the side-chain responds to what it hears– preventing a cymbal from generating a false trigger for a gate on a tom track, for example.

## Basic Side-chain Setup

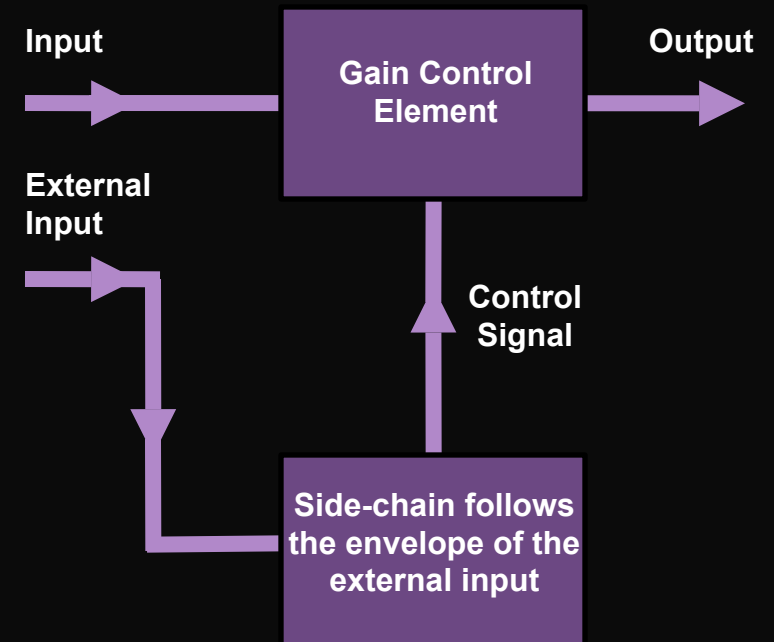


# Side-chaining Explained (cont.)

Normally, the side-chain monitors the level of the channel onto which it has been inserted, but by enabling the "external side-chain" or "key input," you can set it up to respond to a separate signal source. For example, in dance music, where the kick and bass often occupy the same frequency area but both have to have a big presence in the mix, you can "side-chain" the kick to the bass, causing the bass to "duck" whenever the kick hits to avoid phase and muddiness in that frequency area.

The use of external side-chain inputs to control dynamic processors, when set up properly, can do wonders for a clean, punchy, "pumping" mix. This eBook will focus on side-chain compression and how to set it up in four different DAWs.

## External Side-chain Setup



# Compression Parameters as applied to external Side-chaining:

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## Threshold:

The threshold is the level (volume) above which the signal is reduced. Since we are using an external source as our input, lowering the threshold will allow more of that source's material to affect the compressor, resulting in greater attenuation, especially when combined with steeper ratios.

## Attack:

The attack is the time period during which the compressor is decreasing gain once the side-chain input has exceeded the threshold. Since our primary goal is to “duck” one signal to make room for another, as short an attack as possible without introducing any clicks or other distortion is usually ideal, although longer settings can be applied for a smoother transition.

## Release:

The release is the time period during which the compressor is increasing gain to the original level once the side-chain input has fallen below the threshold. Use shorter release times for transparent, subtle effects. Use longer release times for more dramatic “pumping” and “swelling” effects.

## Ratio:

The ratio determines the input/output ratio for signals above the threshold. Higher ratios, when combined with lower thresholds, yield the most dramatic results and allow the most control over the level of attenuation. For example, a ratio of  $\infty$ :1 will ensure that the compressed signal drops to the threshold level whenever the side-chain input exceeds it. For subtler, dynamic effects, use a lower ratio.

## Makeup Gain:

We are “ducking” a signal to make room for another, so using makeup gain is counterproductive in most cases.

## Knee:

This controls whether the bend in the response curve is a sharp angle or rounded edge. A “soft knee” can be used to make subtle side-chain compression settings feel more transparent, or to help eliminate distortion with more extreme settings. Remember, though, that this control affects how the compressor responds during both its attack and release phases, so make sure to check this behavior as you adjust it.

# Side-chain Compression Procedure Overview

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1.

Insert a compressor on the track you wish to compress and enable its “external side-chain” or “key input.”

2.

Route the external input signal to the compressor's “external side-chain” or “key input” and set the desired input level.

3.

Set the gain reduction ratio to the desired setting. Higher ratios yield more dramatic results.

4.

With both sound sources playing, lower the Threshold control until the desired effect is achieved.

5.

Solo the compressed signal and adjust the Attack setting to as short as possible without introducing any pops, clicks, or other distortion into the signal.

6.

With both sound sources playing, adjust the Release setting until the desired “pumping” or “swelling” effect is achieved.

7.

Readjust the compressor's Ratio, Threshold, Release, and Knee settings to fine tune your side-chain effect.

# 1

- Insert a compressor on the track you wish to compress and enable its “external side-chain” or “key input.”

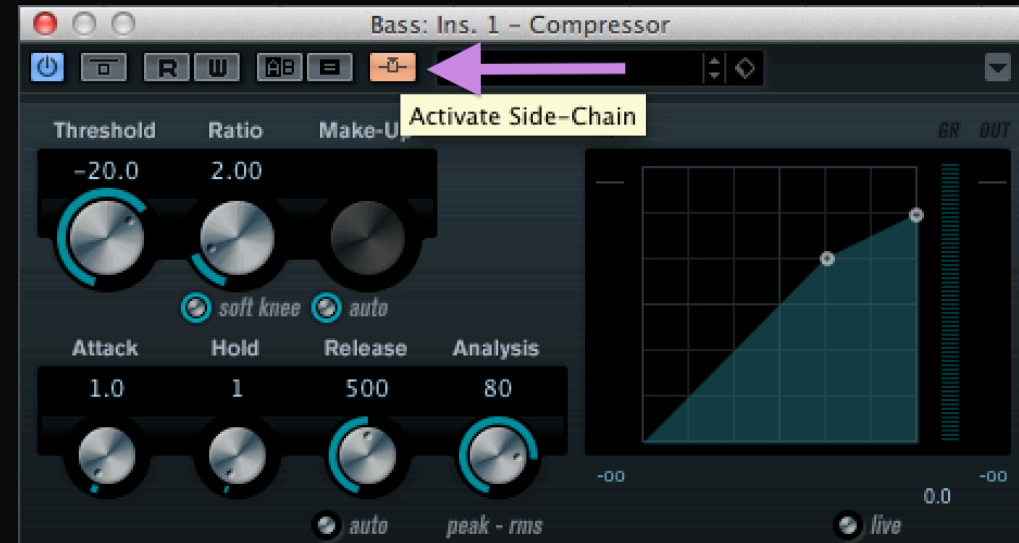
## Pro Tools

Insert a Dyn3 Compressor/Limiter and click the “key” button in the Side-chain section.



## Cubase

Insert a Compressor and click the **Activate Side-Chain** button (last in the row of buttons at the top of the plugin window to the left of the preset menu).



# 2

Route the external input signal to the compressor's "external side-chain" or "key input" and set the desired input level.



A. Add a send to the external input signal's channel strip and set its output to an available MONO bus path (key inputs in Pro Tools only accept mono inputs). In the pop-up send window that opens, set the send to pre-fader and set the send level. In most cases this will be unity (0.0 dB)

## Tip:

Option-click the fader to automatically set it to unity gain.

B. Select the mono bus path from step A from the key input menu located in the top left corner of the compressor's plugin window.

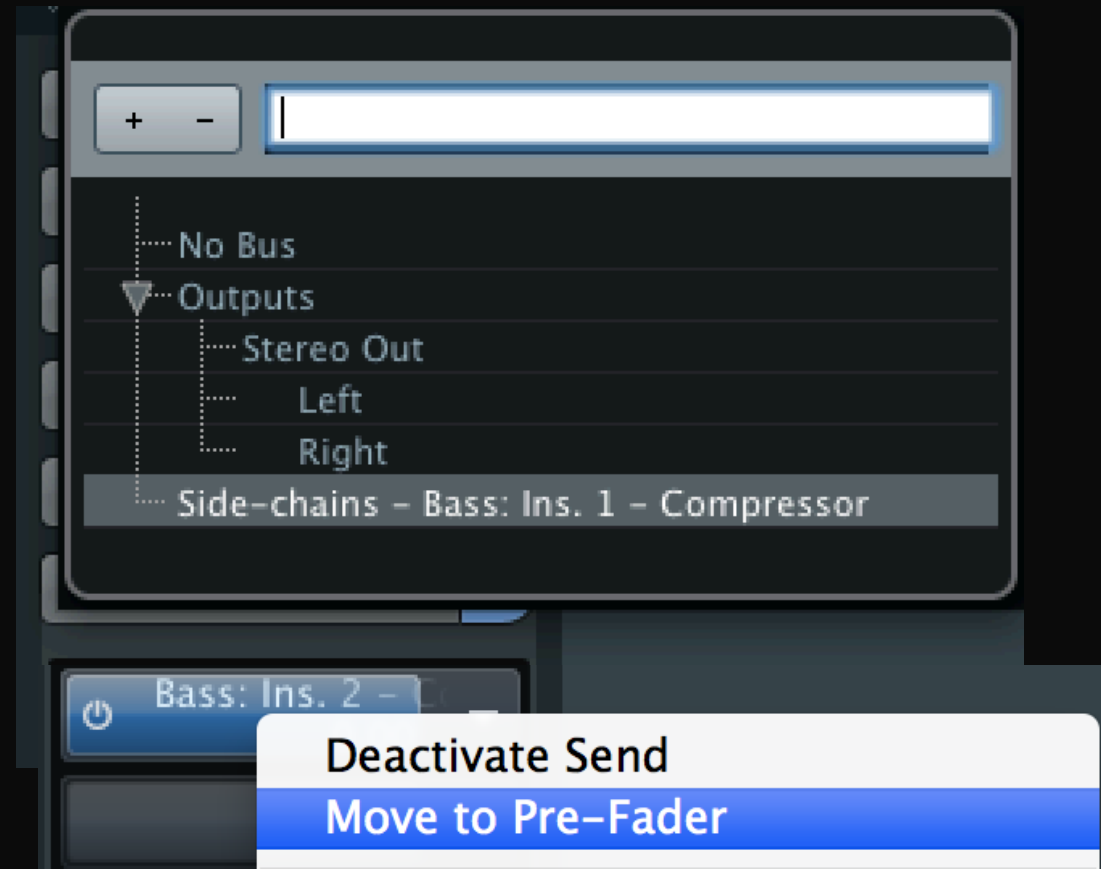
## Pro Tools



2. ■ Route the external input signal to the compressor's "external side-chain" or "key input" and set the desired input level.
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## Cubase

Activate a send on the external input signal's inspector panel, select the side-chain path, move the send to pre-fader mode, and set the send level. In most cases this will be unity (0.00 dB).

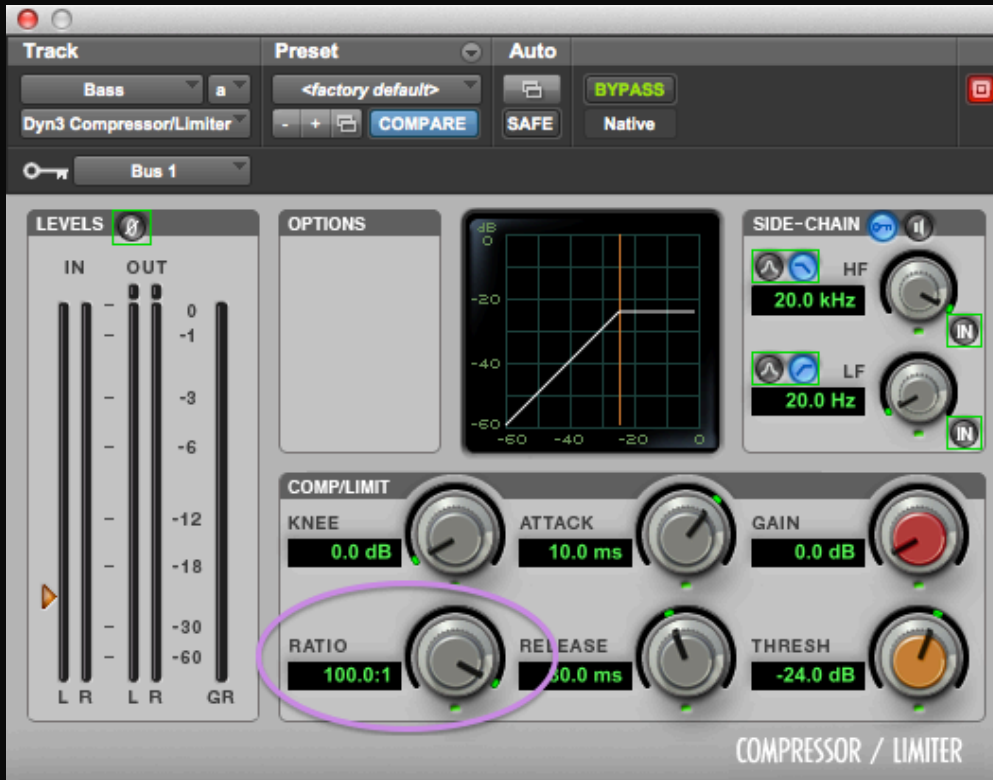




# 3

Set the gain reduction ratio to the desired setting. Higher ratios yield more dramatic results.

## Pro Tools



## Cubase

Make sure to turn auto make-up gain OFF.



# 4

- With both sound sources playing, lower the Threshold control until the desired effect is achieved.

## Pro Tools



## Cubase

**Tip:** Cubase's Compressor defaults to a relatively long release time (500ms). Decrease this first to a short release time (~20ms) before lowering the threshold.



# 5

- Solo the compressed signal and adjust the Attack setting to as short as possible without introducing any pops, clicks, or other distortion into the signal.

**Tip:** With harmonically rich sounds, these clicks can be difficult to hear. To make them more apparent, temporarily insert a low-pass filter before your compressor while dialing in your settings.

## Pro Tools



## Cubase

Even with the send set to pre-fader mode, Cubase will mute it when you solo the compressed signal, effectively bypassing the effect. Instead, turn the external input channel's fader all the way down.



# 6

- With both sound sources playing, adjust the Release setting until the desired “pumping” or “swelling” effect is achieved.

**Tip:** Remember that during the release phase, the compressor is *increasing gain* to get back to the original signal level. Keep release times short unless you want to deliberately create a “swelling” effect.

## Pro Tools



## Cubase

Cubase's Compressor includes a separate **Hold** setting which will hold the compressed signal at the attenuated level for a period of time once the side-chain input's signal falls below the threshold before triggering the release phase. It also includes an **Analysis** setting for controlling the compressor's response between peak and RMS (average level) analysis. Peak analysis ensures a more immediate response while RMS analysis creates smoother results.



# 7

- Readjust the compressor's Ratio, Threshold, Release, and Knee settings to fine tune your side-chain effect.
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## Use these guiding Principles:

- **Increase the ratio** if you want the effect to be more dramatic.
- **Decrease the ratio** if you want the effect to be more subtle and/or dynamic.
- **Raise the threshold** if you want less attenuation over a smaller portion of the side-chain input's signal.
- **Lower the threshold** if you want more attenuation over a larger portion of the side-chain input's signal.
- **Increase the release time** to add and/or lengthen a “swelling” effect.
- **Decrease the release time** to shorten and/or eliminate the “swelling” effect.
- **Use a hard knee** for an immediate, linear transition between the original and attenuated signal.
- **Use a soft knee** for a smoother, “curved” transition between the original and attenuated signal.

# Audio Examples

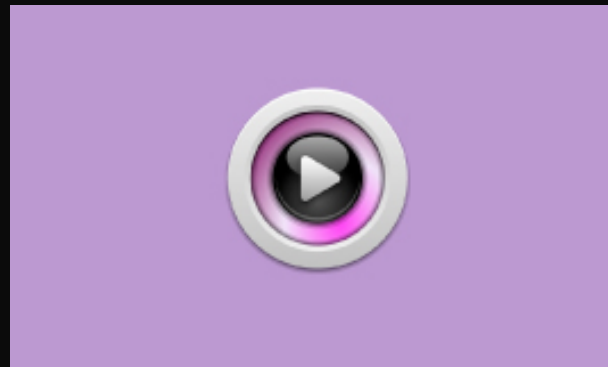
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Before Side-chain Compression



After Side-chain Compression



Side-chained Bass Soloed



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