

## Cat Fantastic real-time Timbral Crossfading Process

This document explains how multiple timbres may be crossfaded into and out-of one another.

The whole process is controlled via MIDI continuous controller messages, and as a result it can be easily applied to several different tracks (e.g. for processing 6 strings separately) by routing a single MIDI track to send CC messages to all of the desired audio tracks.

Five different CC messages are used in the setup:

MIDI CC Number	Use
20	Helix Line 1
21	Helix Line 2
22	Helix Line 3
23	Helix Line 4
24	REAPER "Wet/Dry Mix" for Helix Native plugin

Table 1: MIDI CC data used in the process

### Helix Setup

Inside of Helix Native, a preset should be made which contains up to 4 lines that each have their input and output set to "Host". This means that the audio signal entering the plugin will be routed through four parallel signal chains, and different processing can be applied to each.

The input or output can be mapped by clicking on one of the circles at the start or end of a line inside of Helix and then clicking the destination in the menu below (see Figure 1).

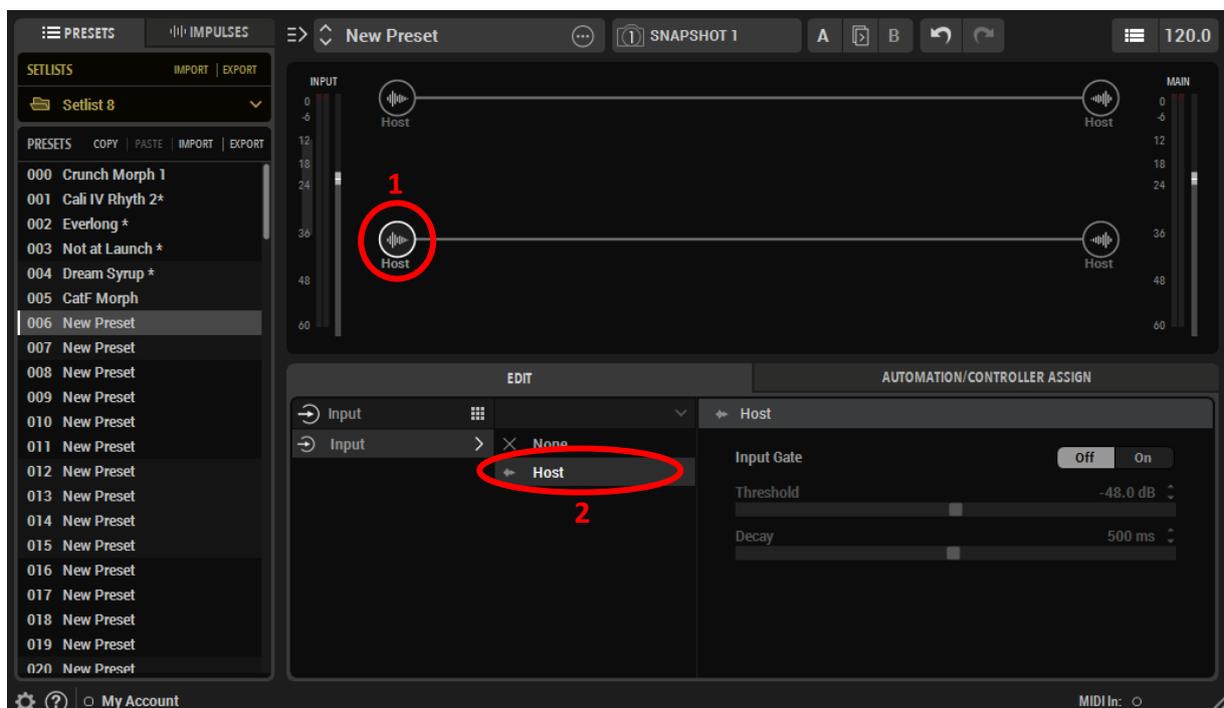


Figure 1: Setting the inputs and outputs in Helix

To create more than 2 lines inside of Helix, any processing block can be dragged using the mouse to where a line is needed. This creates a “Split” and a “Merge” module at the points where the line branches. To create a completely separate line, these modules should be dragged to below the existing input and output of the existing line, respectively (see figures 2 and 3).

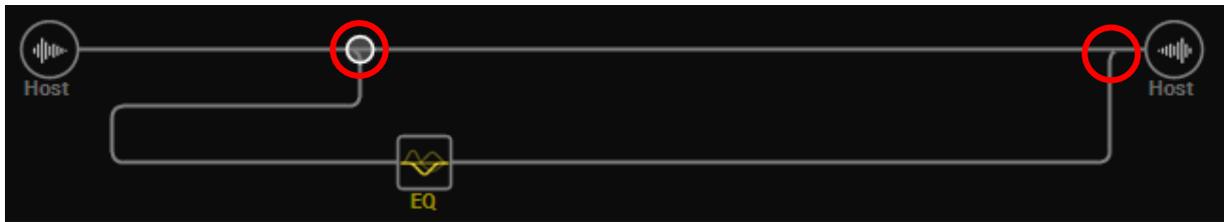


Figure 2: A newly created line with split/merge modules



Figure 3: A new, separate line

MIDI CC numbers 20-23 need to be mapped to the output of each line inside of Helix. This allows Helix to respond to any incoming MIDI CC data by altering the output level of each line.

First, the output that is to be assigned to a MIDI CC number should be clicked on the right hand side of Helix and then the “Automation/Controller Assign” menu should be opened in the lower half of the window. Then, the “Level” parameter should be selected in the uppermost dropdown menu. “Ctrl” should be clicked next and the dropdown menu to its right should be set to “MIDI CC”. In the area below, the MIDI CC should be mapped to a number between 20 and 23. Min level should be set around -60dB and Max level should be set to 0dB.

Block	Parameter	Source
Output	Level	MIDI CC 20
Output	Level	MIDI CC 21
Output	Level	MIDI CC 22
Output	Level	MIDI CC 23

Figure 4: Assigning MIDI CC to control Helix

## REAPER "Wet/Dry" Setup

REAPER has a built in feature which allows for the "Wet/Dry" signal of any plugin to be controlled, which is beneficial for the GASP setup as it allows for the unprocessed sound of the guitar to be blended in with the 4 lines in Helix without having to sacrifice one of the lines to serve as the unprocessed sound. It is possible to map MIDI CC data to control this "Wet" parameter. Using MIDI CC for this is beneficial in the GASP setup as it allows for all of the timbral morphing process to be controlled on a single MIDI track, and it also allows for the possibility for control from an external MIDI device.

To assign the parameter to be controlled via MIDI CC data, the "trim" button on the audio track should be clicked (see figure 5). This should bring up a list of many parameters, at the end of which should be the "Wet" parameter. Clicking the "Mod..." button next to this parameter brings up another menu (see figure 6).



Figure 5: The "trim" button in REAPER

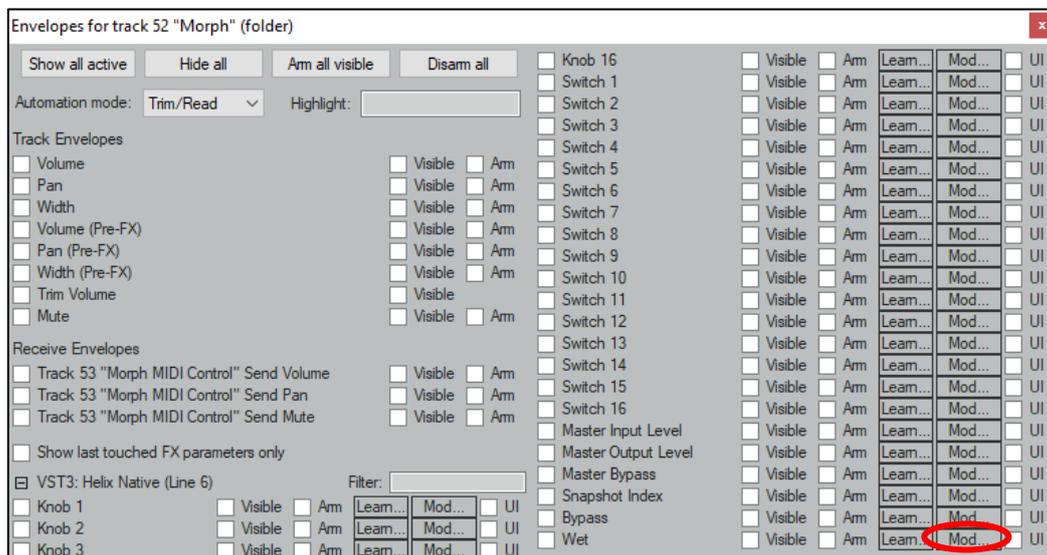


Figure 6: The track envelopes menu

In this menu, the box labelled "Link from MIDI or FX parameter" should be checked, and then "MIDI", "CC", and "24" should be selected (see figure 7). The track can now be controlled by any MIDI that is routed to it.

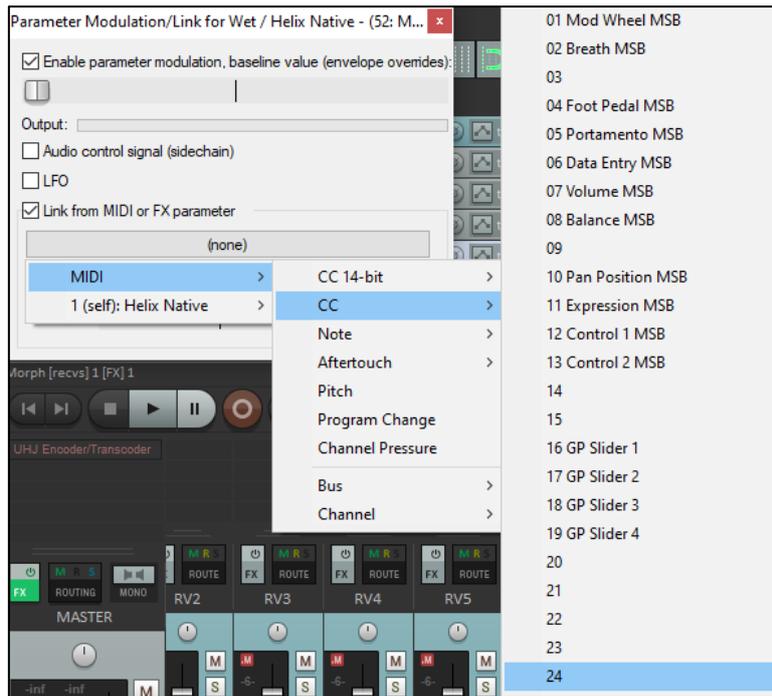


Figure 7: The parameter modulation menu

### REAPER MIDI Routing

A new track should be created to contain the MIDI data used to carry out the timbral morphing. A suitable name for this track would be "Morph Control MIDI". In the "Routing" menu for the track, a send should be added which connects the track to any tracks that are intended to have timbral morphing applied to. As the new track is only intended to send MIDI data, the audio send can be set to "None" (see figure 9).



Figure 8: The "Route" button in REAPER

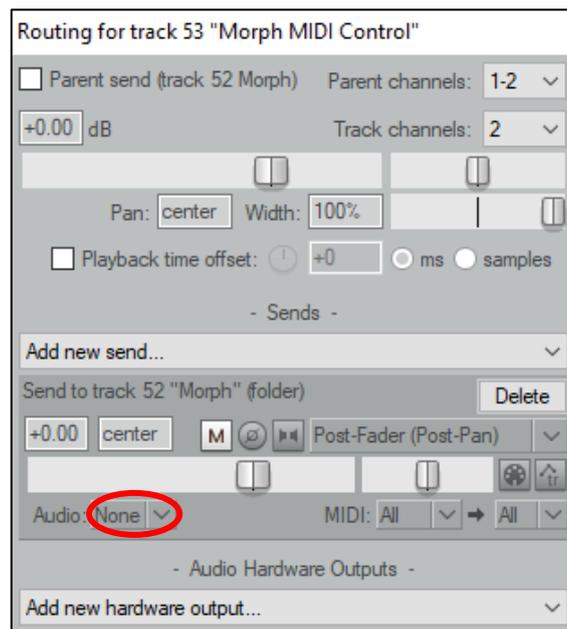


Figure 9: The routing menu with audio sending disabled

## REAPER MIDI Programming

To create MIDI data to control the timbral morphing, an empty MIDI item should be created on the “Morph Control MIDI” track by clicking “New MIDI Item” in the “Insert” menu at the top of the screen. Then this MIDI item should be double clicked to open it in the MIDI editor. The “plus” icon in the bottom left of the MIDI item window should be clicked until 5 lanes are present. These lanes can be resized to fill the MIDI item window as the “piano roll” area of the window is redundant in this scenario. Using the dropdown menu on the left side of each lane, the lanes should be set to CC 20-24.

MIDI CC data can be added to a lane by holding the “Ctrl” key and clicking inside it. To create a custom curve, part of the red line between 2 points should be left-clicked and then right-clicked to bring up a menu which allows a CC curve type to be selected. Generally, curves which favour higher CC values seem to sound more natural. This means that “fast start” should be selected when the CC value is increasing and “fast end” should be selected when the CC value is decreasing.

Figure 10 shows an example of how MIDI CC data may be programmed for a track which morphs between 4 different timbres and an unprocessed “Through” sound. The top 4 lanes are controlling the output level of the 4 lines in Helix Native and the bottom lane is controlling the “Wet” parameter of the plugin, with a maximum value resulting in a 100% wet signal.

In order to fade from a “Through” sound to a processed sound, the output level of the Helix line should be set to the desired level before the CC curve is added to the CC 24 lane. Otherwise the signal may be quieter than intended during the transition.

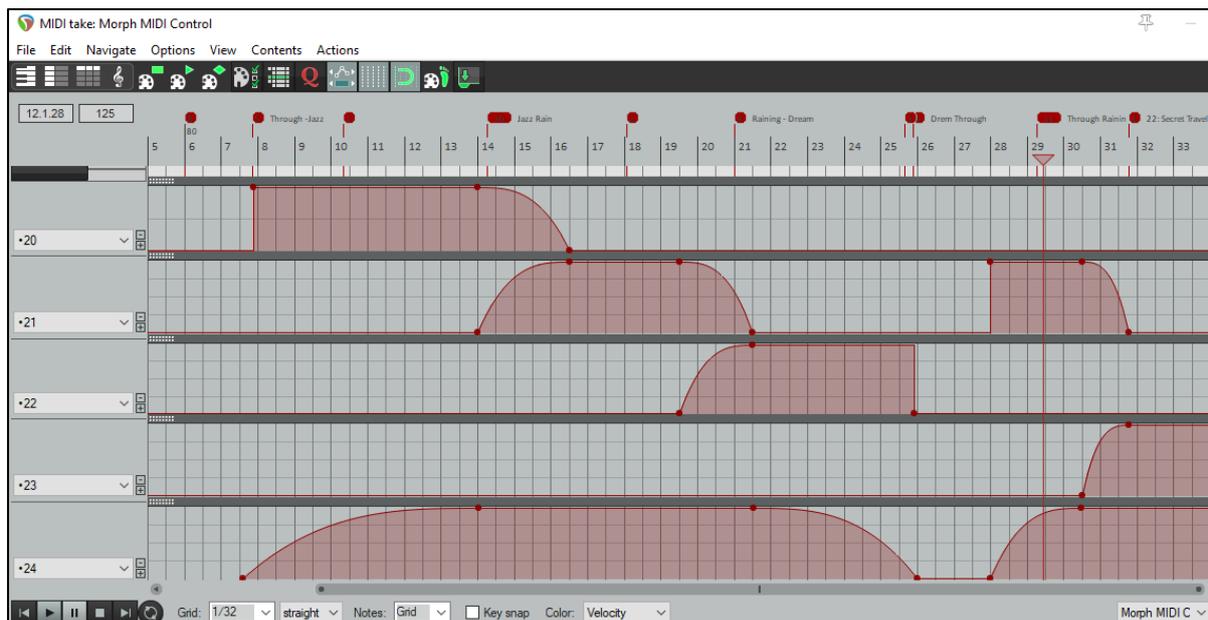


Figure 10: An example of some MIDI CC data