

Patch and Transpose Plugin

Preface

The main purpose of the *Patch and Transpose* plugin is supporting musicians that do live playing VSTs, using Reaper as a VST host.

Here it provides two different functions:

1. **Transpose** the notes in a Midi data stream that is run through the plugin.
2. Manage **Patch changes** of VSTs or external hardware devices via Midi messages.

Both functions are done in a single “effect” plugin, as in a DAW, only one plugin's GUI window can have the focus and hence will receive computer-keyboard shortcut messages. As one of the purposes of Patch and Transpose is to make the functions available via computer-keyboard shortcuts, they need to be merged within a single plugin.

The Elements of the System

The *Patch and Transpose* system consists of four plugins that are used in combination:

1. The **Patch and Transpose plugin** is the workhorse, that in realtime receives commands, sends out Midi messages, and shows the current state in an “always on top” Window.
2. The **Patch Shortcuts User Interface plugin** provides sliders (currently 31) that assign Patch and *INC/DEC* List numbers to keyboard shortcuts. This plugin needs to be loaded exactly once in a Reaper session. It can reside anywhere and does not need any Midi or Audio routing.
3. The **Set List User Interface plugins** provide sliders (currently 33) that define what actions are to be done when an “**INC**” (usually **Arrow-Up**) or a “**DEC**” (usually **Arrow-Down**) keyboard shortcut is detected. The plugin comes in two variants:
 1. The “**Set List -> Patch**” (*Direct*) version
 2. The “**Set List -> Shortcut**” (*Indirect*) version

In a Reaper session, this plugin can be loaded multiple times (the two versions even can be used side by side, if you think that is appropriate). But none of these plugins is necessary for the Transpose / Patch system to work (see below). The instances can reside anywhere and do not need any Midi or Audio routing.

Each instance of a *Patch Set List User Interface* plugin can be given a speaking name that is displayed in the *Patch and Transpose/Patch* plugin's windows when this Set List is active.

Transpose

You can place the *Patch and Transpose* plugin in a Reaper track's FX chain and run the Midi data stream through it. The plugin provides a user interface, that shows three auto-resizing buttons. The left one is labeled “-”, and the right one is labeled “+”, while the middle button (in red numbers) shows the amount of transpose in semitones (if any transposing is set). Clicking the left or right button decreases or increases the semitone offset, while clicking the middle button sets the transpose to Zero. The keyboard shortcuts “**Arrow-Left**”, “**Arrow-Right**” and “**0**” are assigned to these functions, as well. Moreover external Midi controllers can be use to set the transpose amount (*see below*).

The *Patch and Transpose* plugin features an invisible “Transpose” Slider that is seen as a named plugin - parameter by the DAW. Reaper will save the value in the project file and restore it when loading the project. So you can place the plugin in as many tracks as appropriate and when loading the project, the transposing is correctly in place with any track. Moreover the transpose offset can be automated via this slider.¹

If you want to achieve a “Master”-transpose feature, you might want to create a “Master” or “Midi Input” track and route the Midi bus through that track. You now can “float” the *Patch and Transpose* plugin (e.g. by a double click on it's name in the list of plugins in the FX chain) to see a sizable window that (it fixed with the top right “pin”) sits “always on top” of the main Reaper window, and stays “in Focus” (i.e. it gets key-press messages). Here you will see an appropriately big resizable status display.

¹ Beware that when the transpose is changed, all currently active notes are canceled by sending an appropriate key-off-message, To avoid any risk of hanging notes, (other than with some other transpose plugins) no note-on events with the new note number are sent.

Patch Management

Purpose

The patch management is controlled by Midi input and keyboard shortcuts and sends out Midi messages such as “Program Change” or “CC”.

With that, the *Patch and Transpose* plugin can control VSTs and external Midi enabled devices, but for live musicians, it is especially useful in combination with the (free) SMS “**LiveConfigs**” tool. Here, the Midi output is routed to *LiveConfigs* via the additional (free) “**MidiToReaControl**” plugin and activates one of the lines in a *LiveConfigs* Table, that in turn will switch to a “patch” (aka “program” or “sound”) that is defined by the multiple settings, *LiveConfigs* allows for. (See the *LiveConfigs Documentation* for details.)

As an input, the *Patch and Transpose* plugin accepts Midi messages and keyboard shortcuts².

The *Patch and Transpose* GUI window includes a drop-down box that allows to define the way, the Alt key (with appropriate keyboard shortcuts) and the up/down Arrow keys are used. The selectable options are:

- Alt-key:
 1. selects Set List — no Alt directly activates a Patch
 2. Alt-key selects Patch — no Alt selects a Set List, activating the “Entry” Patch
- Arrow Keys:
 1. in a Set List, Arrow up triggers INC — Arrow down triggers DEC
 2. in a Set List, Arrow up triggers DEC — Arrow down triggers INC

Keyboard shortcuts

The *Patch and Transpose* plugin will react to several types of keyboard shortcuts:

1. Direct Patch selection

A direct patch selection is executed, when a keyboard shortcut^{3,4} is detected that matches one of the (currently 31) different shortcuts, that are defined in the *Patch Shortcuts User Interface* plugin.

This action sends out the patch number to be selected via Midi and updates the patch number and the shortcut name shown in the status window. The *Set List* position is not modified so that the next *INC/DEC* shortcut action is not affected.

2. Selecting one of the Set Lists, that are managed by the *Patch Set List User Interface* plugins

2 See below on how to define shortcuts and the kind of Midi messages to be received and sent.

3 With or without Alt, according to the Alt-Key mode

4 To allow for ALT key combinations, the plugin needs to be assigned the option “Send all keyboard input to plug-in” by right-clicking on it's name. As this is not always desirable, the plugin does not automatically request this option.

This action is executed, when a keyboard shortcut is detected that matches one of the (currently 31) different shortcuts that are defined in the *Patch shortcuts User Interface* plugin^{5, 6}.

As a result, the Set List that corresponds to the shortcut⁷ is selected and the patch denoted by the “*Entry Point*” within it's “target” sliders is sent out via Midi. Moreover the plugin's Window is updated to show the appropriate Set List's number and name, the INC/DEC-Position and the Patch number, and - with an “indirect” List - the selected Patches shortcut description.

3. Direct Patch Selection by INC/DEC Shortcuts

This action is executed, when the “**INC**” shortcut (usually **Arrow-Up**) or the “**DEC**” shortcut (usually **Arrow-Down**) is detected, and the Set List (i.e. *Set List User Interface* plugin) instance previously selected by a key shortcut is a “*Direct*” one. The patch that is denoted by the appropriate slider (previous or next regarding the position pointer in that Set List) is selected via Midi according to the slider value (0 ... 127), the *INC/DEC* position is updated, and the status window is updated appropriately (without a shortcut description for the target Patch).

4. Indirect Patch Selection by INC/DEC Shortcuts

This action is executed, when the “**INC**” shortcut (usually **Arrow-Up**) or the “**DEC**” shortcut (usually **Arrow-Down**) is detected, and the Set List (i.e. *Set List User Interface* plugin) instance previously selected by a shortcut is an “*Indirect*” one. First, the appropriate slider (previous or next regarding the position pointer of that Set List) is evaluated (resulting in a value 1 ... 31) and then the patch denoted by the appropriate slider in the *Patch Shortcuts User Interface* plugin is selected and the resulting Patch Number (0 ... 127) is sent via Midi. The *INC/DEC* position is updated, and the status window is updated appropriately (including the shortcut description for the target Patch).

With this, the “musician” e.g. can set up a patch-lists List for each song of a gig without needing to know about the internals (i.e. patch/program numbers) of the target sound engine, just by entering the direct-patch-selection shortcuts he is used to, in the slider interface of the multiple instances of the *List -> Shortcut* (indirect) User Interface plugin.

5. Returning to the previously used Set List position

With a direct *Patch selection*, the position within the current Set List is preserved. You can return to that position by hitting the “**RETURN**” shortcut (usually the “**Enter**” key)⁸. With this, you e.g. can go back to a gig/song sequence after deviating for an unforeseen solo part. The status window is updated appropriately.

5 With or without Alt, according to the Alt-Key mode, opposite to a *Direct Patch Selection*.

6 The key press will be ignored, if no Set List is defined for the shortcut.

7 See below.

8 The INC/DEC shortcut also behaves as if there had been no direct Patch selection in between.

6. Exit from using *Set List* usage

The shortcut “.” (Full stop) exits all *Set List* usage and has the *INC/DEC* shortcuts simply work on Patch numbers. Appropriately, in the plugin's window only patch numbers are shown. The starting point of this mode is the currently active Patch. The same mode is active when no *Set List User Interface* plugins are active within the DAW.

7. Not using the *Set List User Interface* plugins: stepping the Patch numbers

If no *Set List User Interface* plugin is loaded in the current Reaper project⁹, the “**INC**” and “**DEC**” shortcuts simply increase or decrease the current patch number (0 ... 127) and send out the result via Midi. The status window is updated appropriately (without a shortcut number and shortcut description).

Assigning Patch numbers to Keyboard Shortcuts

This is done using the **Patch Shortcuts User Interface plugin**.

Here you have (currently) 31 sliders, each of which is assigned to a (fixed) keyboard shortcut (currently **A ... Z**, **Shift A ... Shift E**). The appropriate shortcut is written left of the slider.

Each slider can be set to 0 ... 127, denoting the patch number that is to be sent out via Midi when that keyboard shortcut is detected.

Moreover, left of the slider, a number (currently 1 ... 31) is given. This is the value to be set in the “*indirect*” version of the *Set List -> Patch User Interface* plugin to access the appropriate shortcut for “indirect” actions.

The assignment of the keyboard shortcuts to the sliders is done in the plugin's “open” source code¹⁰.

Using Set Lists

If you load multiple instances of the **Set List -> Patch (Direct) User Interface** and/or the **Set List -> Shortcut (Indirect) User Interface** plugins in a Reaper project, the *INC/DEC* actions are executed according to the settings of the sliders in that plugins.

The **first** slider - called “**Set List Shortcut**” - on that plugin defines the shortcut to be used (with or without the **ALT** key), to select this Set List to hold the pointers to the patches to be selected by *INC/DEC* actions¹¹. The shortcut to be assigned to the Set List will be shown in red in a button at the bottom of the window.

⁹ Or they all are deactivated

¹⁰ See below how to modify the shortcuts if they are not appropriate for your work flow.

¹¹ It is not possible, to assign the same shortcut to multiple instances of the plugins.

When first loaded, a Set List will be assigned to the lowest free shortcut. Of course, the shortcut assignment is stored by Reaper in the project file.

The **second** slider - labeled "**Entry Point**" - denotes the number (position) of the slider in that Set List that gets active when selecting the list by a shortcut.

With the "**-> Patch**" version of the plugin, the other sliders (**1 ... 31**) define the patch number (0 ... 127) to be selected when the *INC/DEC* position reaches this slider number.

With the "**-> Shortcut**" version of the plugin, the other sliders (**1 ... 31**) (value range currently 1 ... 31) define the number of the slider in the *Patch Shortcuts User Interface* to be executed when the position reaches this slider number. When moving any of these sliders, the assigned shortcut will be shown in a button at the bottom of the window.

At the bottom of the plugin's window there is a wide "button" that is labeled in yellow with the name this Set List is given by the user. This name will be shown on the *Patch and Transpose* window to denote the currently active *INC/DEC* List. To edit this name click on the button and type in the letters. Additional to normal characters these keys are recognized:

- Backspace: delete the last letter
- Enter: finish editing and use the text shown as List name.
- Ctrl-B: use the currently active Set List name in the edit field.

The Set List name will be saved by Reaper in the project file.

Special Considerations when using SWS LiveConfigs

Learn

To make a *LiveConfigs* table listen to a certain CC number and Midi channel, a “**Learn**” action needs to be done with LiveConfigs. Here, it needs to be sent an appropriate Midi message. If you use the *Patch and Transpose* plugin to generate the Midi messages, you can't execute a keyboard shortcut at that point. That is why a special feature is provided: when clicking on the small button labeled “**Patch**”, it starts flashing and the current patch number is sent out twice a second.

Display

LiveConfigs optionally shows a nice floating “Monitor” Window. This can be used to show a description of the selected patch in clear text. This goes together very well with the *Patch and Transpose* Windows displaying the Set List name.