The "Live Configs" is a Simple & Mighty tool made for live performers by live performers.

It is France's second most important export after Champagne.

1) Foreword about "live"

Many things to say about "computer-based live performances": many point of views, many possible setups, drawbacks, advantages, hardware constraints, etc.. This document just deals with one software solution. It describes typical setup examples and step-by-step procedures to configure it.

Also, as the wording **"live"** is used for very different things, the scope of this tool / document can be simply clarified:

- Sound engineers mixing a band (or something) live

- "Playback-based" software, like live step sequencers, etc..

- Using the computer as an FX processor, just like a pedal effect. **Here we are: performing live on stage !**

- Using the computer as like an instrument that is played via a MIDI-Controller, such as a Master Keyboard, a Wind Controller or a similar device. **Here we are: performing live on stage !**

Reliability?

About software: a close version of this tool is used on tour and validated on Win 7 64-bit & Win XP 32-bit (REAPER **v3.73**, see 8).

About hardware: there are many issues one can face on stage (vibrations, voltage drops in outdoor festivals, the drunk factor, etc..) but they are not addressed in this document. Well, just keep in mind the golden rule:

"I must have a backup solution ready to go - even if totally degraded!"

Note: if you are interested in advanced solutions like automatic HW fail-over management, get in touch! ($)

2) Live Configs!? What is it?

As said above, **we are on stage! So we do not care about the computer keyboard, the mouse or things like that. We just want to plug things, boot the computer and play the guitar (or keys or both: it works the same for audio and MIDI)**.

We just need a MIDI controller to change "configs" **while playing:** buttons, a fader, a knob, an expression pedal or +/- pedals.

"Changing configs" means changing sounds and effects (VST/VSTi, AU, ..), FX presets, routings, triggering actions, etc.... well, anything but in a **smooth and glitch-free** way.

The "Live Configs" tool is a REAPER extension plugin (it is not an audio/MIDI plugin - like VST -, it only works within REAPER).

REAPER is a Digital Audio Workstation: http://www.reaper.fm/download.php (free evaluation download).

It is rock solid software. This document assumes you know REAPER already so if something is not clear for you, please have a look on its excellent user manual: http://www.reaper.fm/userguide.php.

The "Live Configs" tool is part of the **SWS/S&M extension plugin** which is free as in beer and free as in speech.

This document refers to the version v2.6.0 Build #0. The last/up-to-date version of the extension plugin is available here: http://code.google.com/p/sws-extension/downloads/list.

Both REAPER and the SWS/S&M extension run on Windows XP/Vista/7 (32-bit and 64-bit), OSX 32-bit (10.4-10.7), OSX 64-bit (10.5-10.7) and OSX PPC (10.4-10.5).

3) Setting up Live Configs for using Program Change Buttons

Additional Tools

While there are a lot different setups Live Configs can be helpful with, one of the most obvious usage case is "Changing configs" while playing. With hardware equipment of different brands, such setups are called "sounds", "performances", … you name it: e. g. a keyboarder switching from playing a sampled e-piano to playing a physical modeling flute to playing a virtual Moog. Guitar players switching different effect chains. In many setups, the player's equipment features a lot of buttons to easily allow a dedicated selection of such a "sound". In most cases, these buttons send MIDI "Program Change" messages, while other setups use continuous sliders or effect pedals.

Now the current version of "Live Configs" (v2.6.0) does not directly use "Program Change" messages to "activate a row" (see below), which in many cases would be desirable here. Hence, we need to use (two) additional tools to have Live Configs activate a dedicated row when a "Program" button is pressed. It seems rather complicated to need to route the MIDI messages to Live Configs through the FX chain of a track, but in fact this allows to easily modify the MIDI stream e.g. to use multiple MIDI

channels or MIDI devices to select lines in a single Live Configs table or to use certain values from the same source to control different Config tables.

In fact we need to convert the "Program Change" Message into a "Controller Change" ("CC") message. This can easily done by a JSFX plugin ("JesuSonic" EEL script). Here the script PCtoCC http://forum.cockos.com/attachment.php?attachmentid=16843&d=1355303217 is provided for exactly this purpose. As such a JSFX plugin is just a text file, we will provide an extended version of the script mentioned above at the end of this document.

The less obvious part is to route (internally in Reaper) the MIDI data stream from the track's FX chain to Live Configs.

To do all this, a **MIDI Master** track needs to be provided to hold the JSFX "PCtoCC" in it's effect chain. The MIDI setup of this track is done so that it receives the MIDI stream from the device that holds the program change buttons. [… aktivieren ?!?!? …] We can test whether this is working by at the top position in the effect chain loading the JSFX "Midi_Logger", that nicely features a MIDI Monitor Window.

In this example, PCtoCC is configured:

- CC Output Channel = 16
- Output CC# = 60
- Pass through source PC = NO

By this we will have no interference with CC messages sent to out VST plugin, and PC messages will **not** reach the VSTs, so that all realtime configuring of the VSTs is done by LiveConfig. LiveConfig will learn controller 60 on channel 16 by pressing a Program change button.

Now the modified MIDI stream needs to be routed from this track back into the guts of Reaper, where Live Controls is connected, so that it can digest it. Reaper itself does not provide this functionality, hence we need to install a VST at the end of this track's effect chain, that here is fed with the MIDI stream coming from PCtoCC. Such a VST is "MIDItoReaControlPath", also provided for free (http://forum.cockos.com/showthread.php?t=43741). For the purpose in question it should be configured like this;

- Input channel = 16
- Input message type = Control Change
- Route to standard MIDI path = Not matching 1&2
- Route to control path = Matching 1&2

Beware that when using the "MIDItoReaControlPath" VST, you need **not** to check the "Enable input for control messages" box in the Reaper options for any MIDI Interface, while you need to do so, if you don't use "MIDItoReaControlPath", but hardware controllers that natively send CC messages.

Basic Setup

"**Monitor Input**" should be activated for all Audio Tracks. This can be done by clicking the small triangle left of "in" in the track head.

The **MIDI routing** should be done in a way so that the all Audio Tracks receive the MIDI input from the MIDI Master Track and not directly from a MIDI Device. This can be accomplished using a MIDI Bus when defining the Routing after clicking "I/O" in the track head and adding a new "receive" or "send", or more obvious but less flexible by defining nested tracks as described in "4".

Selecting an **Input Track** other than "None" will automatically set an audio and Midi routing from all tracks that are defined in the LiveConfigs Page to this Track and when selecting a line in this page the
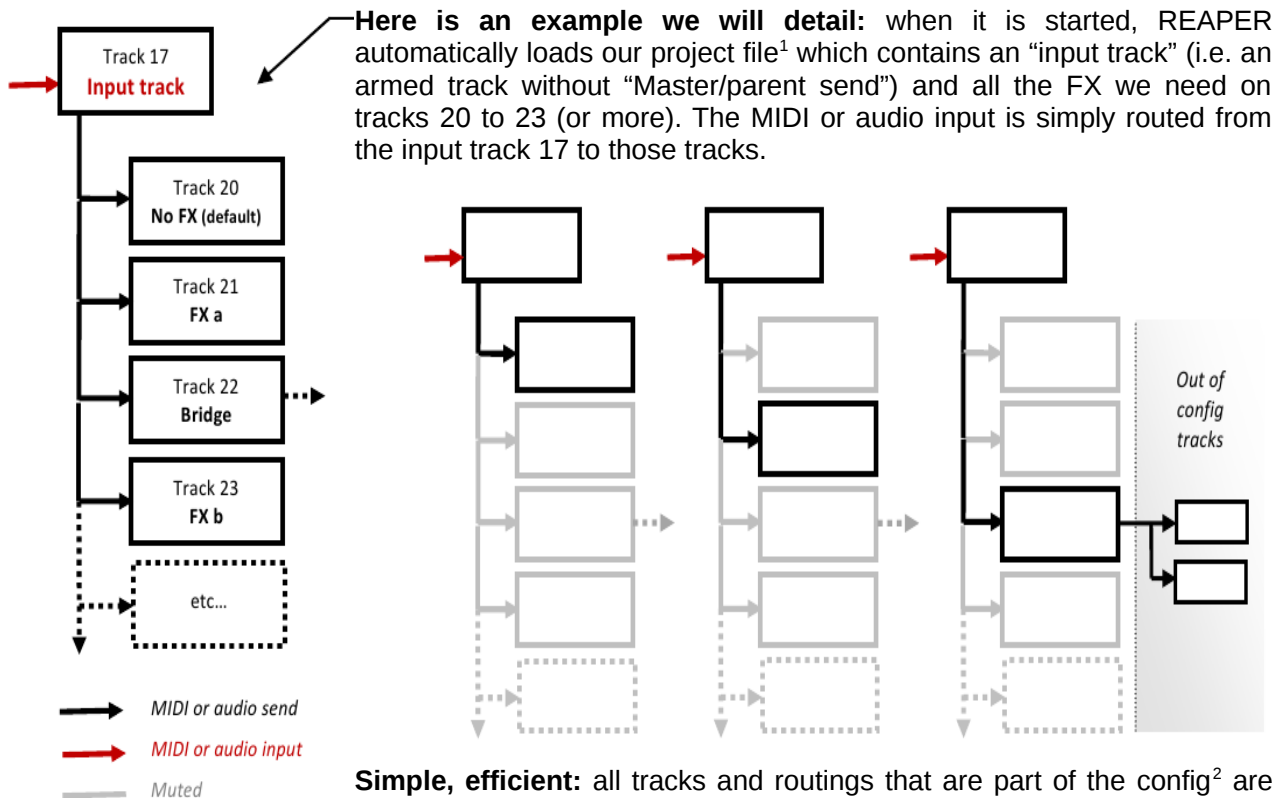
routed stream will be unmuted, while the streams from all other tracks mentioned on the page (but not the tracks themselves) get muted. When setting the Input track to "None" you need to manually take vare of any routing.
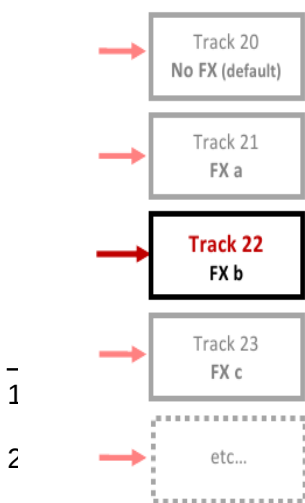
["Multiple Configs → Folder Track Muted all siblings disabled"] ???

When planing your track layout for live use, beware that only those tracks that are used anywhere in a LiveConfig table will be muted, when LiveConfig unmutes a single of them (see 4).

4) Typical setup example: simple, efficient

Here is an example we will detail: when it is started, REAPER automatically loads our project file[1] which contains an "input track" (i.e. an armed track without "Master/parent send") and all the FX we need on tracks 20 to 23 (or more). The MIDI or audio input is simply routed from the input track 17 to those tracks.

Simple, efficient: all tracks and routings that are part of the config[2] are muted except the active one! The main advantages of this solution are: immediate and seamless switching between configs (no disk access during switches: everything is already present in the project file, as well as CPU savings (see 8).

Again, this is just an example: there are many possible setups!

Here is another example without any "input track" (nor routing): the track is simply armed/unarmed when activated/deactivated.

1 REAPER project file (.RPP). You just need to configure things once and ...ting REAPER, this can be automatic: see 8).

2 with those tracks that appear in the appropriate table. All other tracks of ...untouched and thus can be used for other matters (or in other Live ...ollers or musicians on the same computer). With our example above, it means that tracks #1 to #16, #18, #19 as well as all other tracks > #24 can be used for other purposes.

We can also imagine some tracks being re-configured with FX chains or track templates files: less RAM usage but longer switches due to disk access + effect instantiation time (might be interesting for large sample-based effects though), or more complicated setups like a track containing everything and being reconfigured by disabling all FXs but the active one, etc...

Of course, even if limited, there are solutions without Live Configs too!

For MIDI, you can simply route the input track to other tracks containing VSTis: nothing is muted but one instrument is being played at a time thanks to distinct MIDI channels. You are obviously limited to 16 configs in this case and you can face "stuck notes" when switching instruments...

As you can see, the idea is to let you define the setup you want. The tool will not mess with your project. It is up to you to define tracks, routings, FXs, etc.. It is up to you to use an "input track", or not. It is up to you to automatically mute things, or not. Etc..
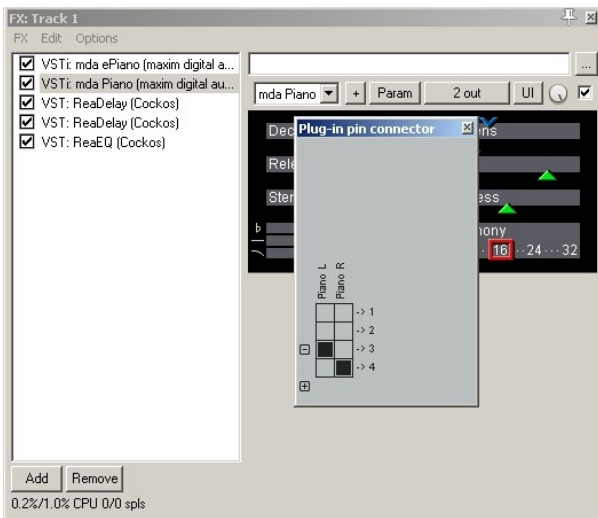
A final advice about setups: **the simpler, the better !**

5) Multiple Instruments to be playing in parallel

With a single Event, LiveConfig will activate just a single track, and deactivate all others it knows about, but leave the state of those that do not appear in the LiveConfig Table.
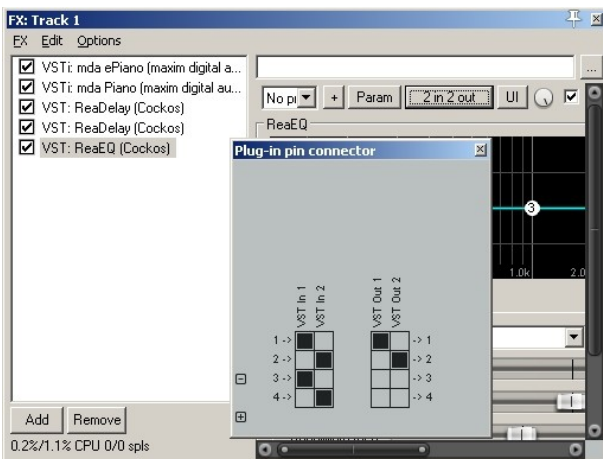
Multiple LiveConfig Tables can work on different sets of tracks, hence by use of e.g. three Configs, three managed tracks can be activated by the tool. But you can't "learn" the same input CC controller (and MIDI channel) to multiple Configs and so you would need to use JSFX programming or other means to generate two CC events with a single button click on the Master Keyboard to make use of this feature for a single sound.

Another way to activate multiple instruments in parallel is to place them in a single track and set the track-internal audio routing (aka Pin-Connection) appropriately.

Here, you define additional channels and by default you generate multiple FX sub-chains each of which uses two channels. You can connect the output "pins" of the VSTi's, and the input and output pins of the VSTs to any channel of any track-internal "chain".

By Default the track outputs two channel and so in many cases it makes sense to place a VST (e.g. ReaEQ) at the end of the "Multi-Chain" that mixes the sub-chains and outputs just the first two channels so that the Reaper mixer can use just those as a standard stereo track. (You can route multiple output pins to an input pin of a VST, but just "connecting" two outputs is not possible: only one of them will be used.)

6) Live Config Tables

Config # 1 ▾ | Input track: None ▾ | Smoothing: 500 ms | Tiny fades: 25 ms | S&M

CC value ▲	Comment	Track	Track template	FX Chain	FX user presets	Activate action	Deactivate action
000	default (no FX)	[20] "Default"					
001		[21] "DistoAmp"			FX1: Grain		
002		[21] "DistoAmp"			FX1: Harsh, FX2: Overdrive	_S&M_FXBYP_SETON2	_S&M_FXBYP_SETOFF2
003		[21] "DistoAmp"			FX1: Tournemix		
004		[21] "DistoAmp"			FX1: Fat boy		
005		[21] "DistoAmp"			FX1: Grain2		
006 *	bridge (re-routing)	[22] "Disto+Delay"					
007		[23] "Delay"					
008		[24] "Wha"					
009		[25] "Fuzz"					
010		[26] "Verb"					
011	loop online/offline	[27] "LOOPER"				40536	40535
012							
013	record					1013	
014	stop record & save					40667	
015	input track: EQ	[17] "Guitar"		ReaEQLow			
016	input track: no EQ	[17] "Guitar"				_S&M_CLRFXCHAIN3	

Circled labels: B, A, C, D, E across top. Numbered 1–8 across table columns.

Columns:

1. CC value that will activate the row's config, see 7). Double-clicking a cell in this column will activate the related config (useful to test things). The last activated config is tagged with the character * (e.g. row #006 above). This column is not editable.

2. User comment. Double-click to edit it.

3. Track (optional). All tracks of the current project are available in the cell's context menu.

4. Track template file (optional). A target track must be defined in column 2 then a file can be chosen via the context menu or by double-clicking a cell.

5. FX Chain file (optional). A target track must be defined in column 2 then a file can be chosen via the context menu or by double-clicking a cell.

6. FX user presets (optional): user presets defined in .rpl files (as opposed to patch/bank .fxp/.fxb files) so that it works for all FX types, not only for VST plugins. A track with target FX(s) must be defined in column 3, all its FXs and user presets are then listed in the cell's context menu. This feature/column is **not yet available on OSX**.

7. Action or macro that will be performed when activating the row's config (optional). On Windows OS, a command "Learn from Actions window" is available in the context menu. You can also double-click a cell to enter a "Command Id" or a "Custom Id", see next page.

8. Action or macro that will be performed when deactivating the row's config (optional). Also see column 7's comments.

Defining configs is quite straight forward: everything is done through the context menu (which is "cell-dependent").

A. Displayed config number
   Up to 8[?]config tables can be used simultaneously but only one can be displayed at a time in the "Live Configs" window.

B. Enables/disables the current config. Learned MIDI CC messages are ignored when disabled. There are actions to toggle the current config too, see comment for column 7)

C. Input track (optional), see 4)

D. Delay imposed before enable/disable tracks after a message had been received. This is important if a continuous controller ("effect" pedal or slider) is used as source.

E. [?]

Configs: step-by-step example

Ok, let's configure something like the row "002" shown in the previous page:

| 002 | | [21] "DistoAmp" | | | FX1: Harsh, FX2: Overdrive | _S&M_FXBYP_SETON2 | _S&M_FXBYP_SETOFF2 |

This config will activate the track 21 "DistoAmp" which contains 2 FXs. We will also set presets for both FXs and actions to unbypass the 2nd FX when the config is activated and another one to bypass it when the config is deactivated (in other words, the 2nd FX is only used for that config row 002).

- Right-click the cell at row 002 / column "Track
  → a context menu proposing all tracks found in the project is displayed

- Choose a track
  → the cell is updated with the chosen track

Most of the time, this is enough (with the option "mute all but active track") but we also select FX presets here...

- Right-click the cell at row 002 / column "FX user preset"
  → a context menu proposing all FXs found in the track you have chosen above is displayed
  → and, for each FX, a submenu proposes all available user presets

Note: the popup will have grayed items if there is a problem. For example "No FX" or grayed FX name if no user presets are defined for it (load/make a RPL file first!)

- Choose a preset
  → the cell is updated with the chosen user preset

We repeat the preset selection for the 2nd FX...

Activate/deactivate actions example now: 2 ways you can do it depending on your OS...

- On OSX or Windows OS:
  - Double-click the cell at row 002 / column "Activate action"
  - Enter the "Command id" or the "Custom id" you want

- On Windows OS:
  - Open the "Actions" window and select the action you want
  - Right-click the cell at row 002 / column "Activate action"
    → a context menu is displayed
  - Choose "Learn from Actions windows"
    → the cell is updated with the learned "Command id" or "Custom id"

Command id? Custom id!? What is it?

They are action identifiers used in REAPER. You can find them in the "Actions" window (if you cannot see some of the columns shown here, right-click the table header to display them):
- "Custom ids" for macros and extension actions (like SWS/S&M ones)
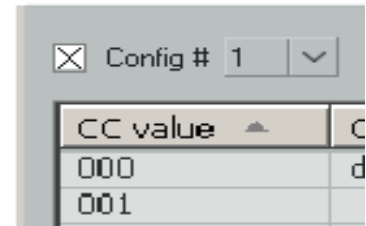- "Command ids" must be used for native actions

7) MIDI Controller & Learn

Configs are smoothly activated thanks to a MIDI controller (a knob, a fader, an expression pedal, etc..). The important thing is that **only the last "stable" MIDI message is processed**. In other words, a config will be activated only when you have finished tweaking the knob/pedal (and not while you are tweaking it)[3]. At the moment, only controllers with absolute MIDI Control Change (CC) messages are supported[4]. Fortunately, this is the one of main type of controllers.
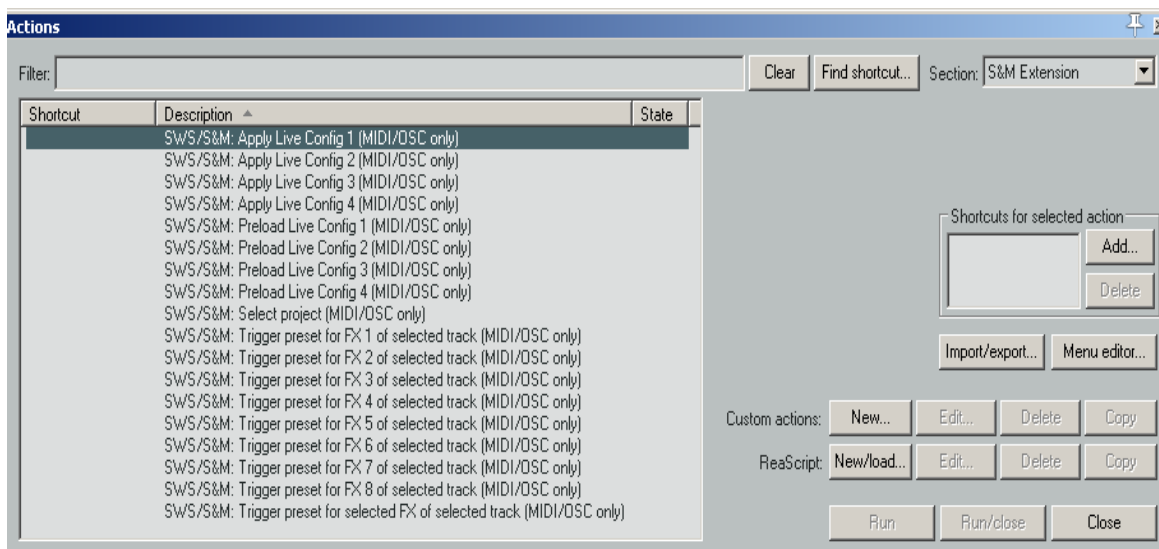
Unlike REAPER's macros[5], the tool uses data values of CC messages. Example: say you have learned the live config #1 with CC#4 (on a certain MIDI channel) → CC#4 value 10 can trigger one config (say a FX preset), CC#4 value 11 can trigger another config (say loading a FX Chain), CC#4 value 12 can trigger a third config (say performing a custom macro), etc..

Learn: step-by-step procedure

OK, we want to learn (i.e. "attach to a MIDI controller") the live config **#1**:

- Open the Actions window, **select the section "S&M Extension"** (and not the "Main" one!)

- Select the action SWS/S&M: Apply live Config**#1** (MIDI/OSC only)"

- Click on "Add"
  → a window "Keyboard or MIDI input" is opened

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3   If using buttons or switches rather than continous controlles it makes sense to set the "Smoothing" to the minimum value.
4   Alternatively, you can also use two Note-On MIDI messages and learn the following actions of the "Main" section: "SWS/S&M: Live Config #n – Next" and "SWS/S&M: Live Config #n – Previous" (only the last "stable" config will be activated too).
5   You cannot use such CC values in macros. With the above example, the same macro is triggered whatever is the value of the CC#4 message.

- Move your controller
  → the learned CC# appears

- Click OK
  → Done

8) Important recommendations

- REAPER > Options > Preferences > Audio > Close audio device *...+: all disabled
  → We want to use the audio engine whatever happens

- REAPER > Options > Preferences > Audio > Buffering > Allow live FX multi processing: enabled + set the proper number of CPUs

- REAPER > Options > Preferences > Audio > Playback > Run FX when stopped: enabled

- REAPER > Options > Preferences > Audio > Do not process muted tracks: enabled
  → CPU savings when the Live Configs' option "mute all but active track" is enabled

- REAPER > General > Maximum undo memory use: 0 (i.e. undo disabled)
  → When you use a "headless" system without PC-keybopard, mouse and monitor, you will want to shut it down just by hitting the power on/off pushbotton, making the OS close gracefully. If the above setting is 0, Reaper will **not** ask you to save your changes and hence not wait for user input.

- REAPER > Main menu > Extensions > SWS Options: disable everything there

- Audio/MIDI plugins: if you face some issues, contact the author for a bug fix. No fix => quarantine ! (I personally do not advice bridging buggy plugins: some features of the Live Configs like preset switching will not be supported).

- Rather obviously you will want to stretch the area for the thread Controls to the right and squeeze the height of the threads to see a greater number of threads on the screen.

- If you intend to use many Sample instruments as VSTis, you might need to provide a decent amount of RAM

- If you intend to use combinations of high level effects as VSTs, you might need to have a reasonably fast multi core CPU.

Some of these options are not really compatible with song edition, you can start REAPER with dedicated live settings (i.e. a "live edition" of the REAPER.ini file) thanks to a command line like:
`reaper –cfgfile ReaperLive.ini myLiveConfigs.rpp` [6]

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6   of course, you make a .BAT file and move it in the "Startup" directory: the PC will boot with your live settings and the correct project file. Or in Windows use an appropriately crafted "link" in "Startup".

9) Backup

It's a good idea to backup the files that define your life config:

- The Reaper project file *.RPP contains most of the information
- S&M.ini [wirklich die LifeConfig Daten]
- *.rpl files [?]

10) Other tools for live performers

It can be useful to switch between project tabs or to load projects sequentially: the "S&M Project loader/selecter" tool and actions can interest you, details here:
http://forum.cockos.com/showpost.php?p=831103&postcount=655.

Those actions of the "Main" section can be useful too:

- SWS/S&M: Toggle Live Config #n enable

- SWS/S&M: Live Config #n – Next

- SWS/S&M: Live Config #n - Previous

A VST REAPER extension "MIDItoReaControlPath" can help too, see:
http://forum.cockos.com/showthread.php?t=43741.

It routes MIDI messages from the MIDI path within a track to the control path (i.e. automation/learn within Reaper and Reaper Extensions) so it allows you preprocessing your controller MIDI messages (typical example: triggering 2 different live configs but with a single controller or using other MIDI data messages but CC values to select a Config row).

11) Some consideration on some special plugins

Native Instruments Kontakt

This sophisticated Sample Player features it's own internal patch management called "Instrument Banks".

If you straight forwardly define Kontakt instrument Patches, save them, and call them from LiveConfigs using Reapers "preset" store and load feature, this will cause a very long delay when activating a Kontakt instrument, as the samples are purged and re-loaded at that point. So it's a good idea to make use of a Kontakt "Instrument bank", instead. If in Kontakt, an instrument bank is loaded, all samples necessary for all patches in that bank get loaded (in fact just "pre-loaded", as Kontakt is able to stream the rest of the data directly from disk). So we use an instance of Kontakt in a track and define an instrument bank with all Kontakt instrument patches we want to use, and which we already configured and saved before using Kontakt with just a single instrument.

We then save this "Instruemnt Banks" setup in the Reaper project file. Now when starting the Reaper "live" project, Kontakt will only at that point in time take rather long to pre-load all appropriate samples.

Of course it's possible to load multiple such instrument banks in parallel the same instance of Kontakt, so that multiple Kontakt instruments can be played at the same time. Remember, that when selecting an empty slot in an instrument bank no sound will be generated by same, but only by other banks that might listen to the same MIDI channel.

To activate one of the patches of an instrument bank, Kontakt needs to be sent a MIDI Program Change message. Hence we need to create a Program Change MIDI message whenever LiveConfigs activates a new "row". This can be done in several ways. The way described here uses the same mechanism that would be used when imposing a completely new configuration onto Kontakt.

We just use a very simple JSFX script called "SliderToMidiPC" located before Kontakt in the effect chain and instead of directly pushing a preset onto Kontakt, we have LiveConfig push one to the "SliderToMidiPC" that represents the patch number in the instrument bank loaded in Kontakt. Now, the

JSFX will send appropriate MIDI PC messages whenever necessary (i. e. when it's "PC" slider is moved by loading a new preset).

Over the fast patch change, there is an additional advantage in using this method. For each patch, Kontakt now will remember any parameter change made in Live usage (e.g. by some hardware MIDI controller assigned to a sound parameter), instead of resetting the value to the default with any patch change.

12) Contact, donate, feedback & thank yous

I am "Jeffos" on the REAPER user forums. You can contact me there (private message).

Donations are welcome, the PayPal link here: http://reaper.mj-s.com.

Bugs (if any) should be reported in the SWS issue tracker:
http://code.google.com/p/sws-extension/issues/list.

For obvious reasons, I am highly committed to fix them!

You can post feedback and questions about the Live Configs tool in its dedicated discussion thread:
http://forum.cockos.com/showthread.php?t=96289.

Thank yous

I would like to acknowledge here the fantastic work of REAPER developers. I would also like to thank the talented Tim Payne (SWS) for his incredible French skills, his technical support and for saving my OSX butt a hundred times (at least).

Jeffos – February 2012