

VST PLUG-IN
Mercuriall Cab v3.0

User Manual



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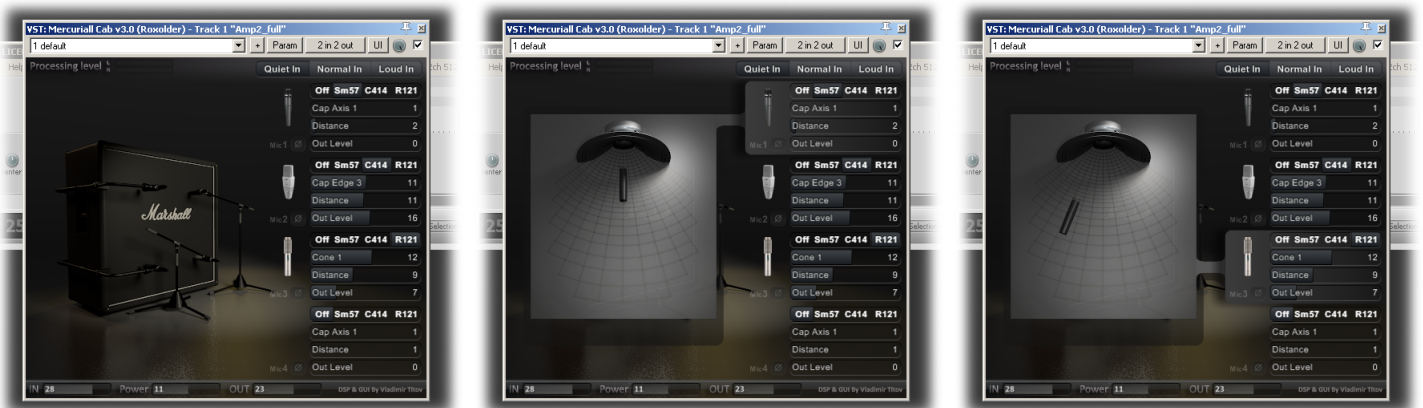
Introduction

When created the previous version of the emulator, I have not been able to make measurements of the signal path in a professional recording studio with the necessary equipment. I was looking for an opportunity to work in the studio for further development and experimentation.

One user wrote me that he wanted to have a new plug-in with a choice of multiple microphones, and if necessary, be able to use multiple microphones simultaneously. He gave an example of how he makes the guitar track in the studio:

The studio has a guitar cabinet Marshall 4x12. We take a dynamic mic Sure SM57 and put in the position of on-Axis on the upper right speaker 1 inch apart on the grill. Then take another dynamic microphone and put it in the position of Off-Axis on the same speaker at the same distance from the grill. Then take a condenser microphone AKG 414 and put in the position of Off-Axis on the upper-left speaker. Add a ribbon microphone Royer 121 a distance of 6 inches from the left speaker. The result is mixed in the correct proportions to obtain the finished guitar tracks.

I have the idea of creating VST-plugin that would be completely replaced by a guitar cabinet and microphone and gave an opportunity to look good position without the need to work with this microphone. I improved the computational engine, and could implement the idea. But I did not have access to the studio, which has everything need to do this. It was necessary to send a test signal on the input of the system and record the response. Recording should be done simultaneously on a large number of microphones. The idea led to the development of user interface, here are some pictures:



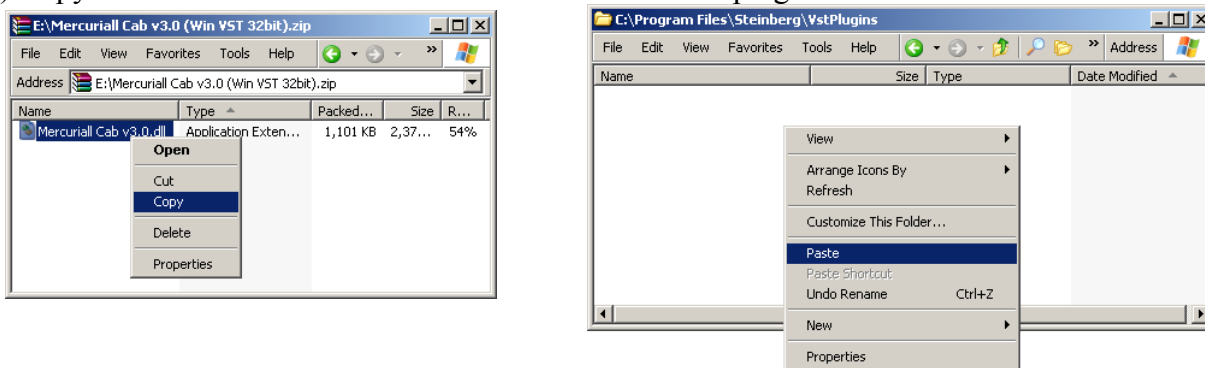
In the summer during my vacation I had the opportunity to go to the city of Ryazan to work in the studio. I was in 6:00 to record responses, and three microphones: Shure sm57, Sennheiser MD421-II, Audiotechnica 4047. I have not had the opportunity to work in the studio more extended period of time. In these limited circumstances the implementation of the original ideas was impossible, and I am completely focused on the development of new modeling method. The measurements were made in the studio were very good quality, and I wanted to make a better simulation than in previous versions of the plugin. It has been tried many approaches, the most interesting in the end proved himself an approach in which the energy of frequency bands affects the formation of the impulse response, which is needed for the convolution of the signal.

The studio work was carried out with the guitar Hiwatt 4x12 cabinet with speakers Hiwatt Custom by FANE and final amplifier section of the Peavey 5150 with an output transformer Heyboer.

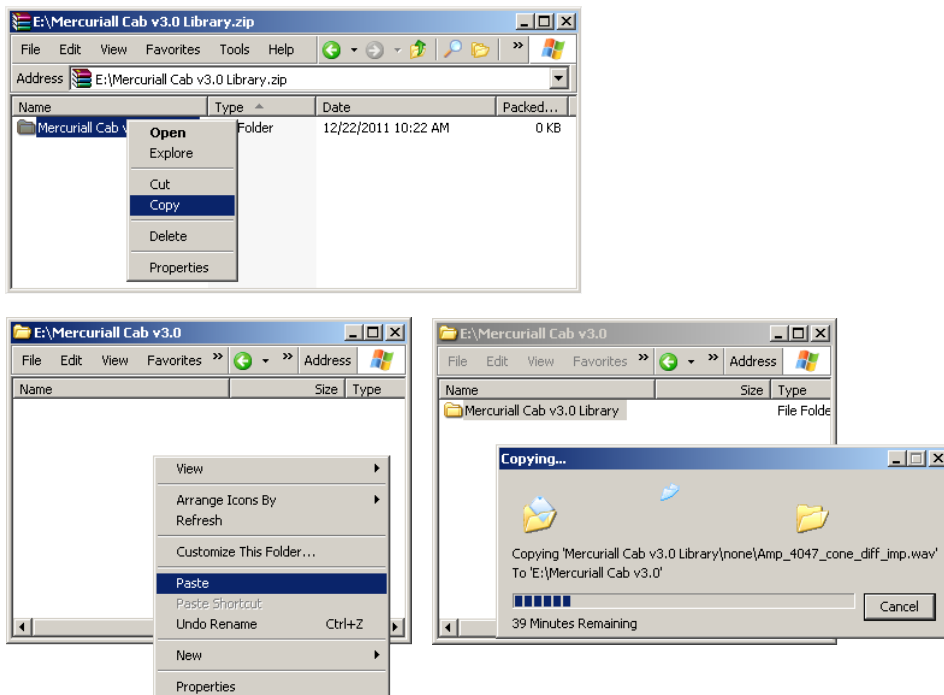
Fate decreed that in your hands is the result of tremendous effort. I hope you appreciate them.

Installation (for example for Windows)

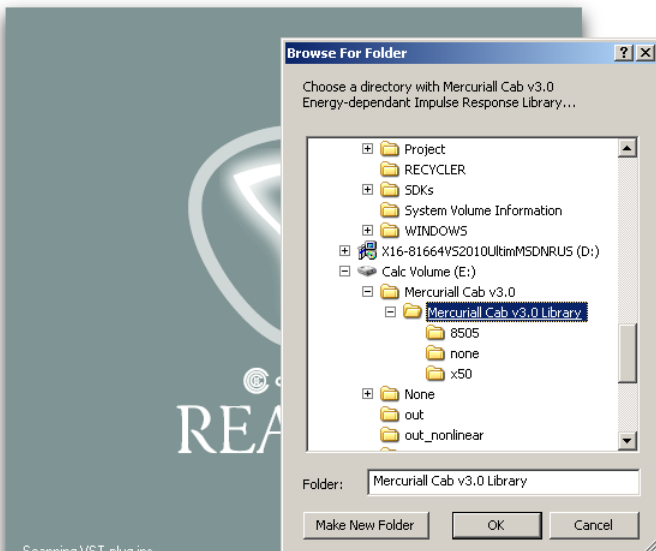
1) Copy file “Mercuriall Cab v3.0.dll” to folder with VST plug-ins.



2) Download the archive with a set of energy-dependent impulse responses «Mercuriall Cab v3.0 Library.zip» and unzip the archive to a convenient place for you:



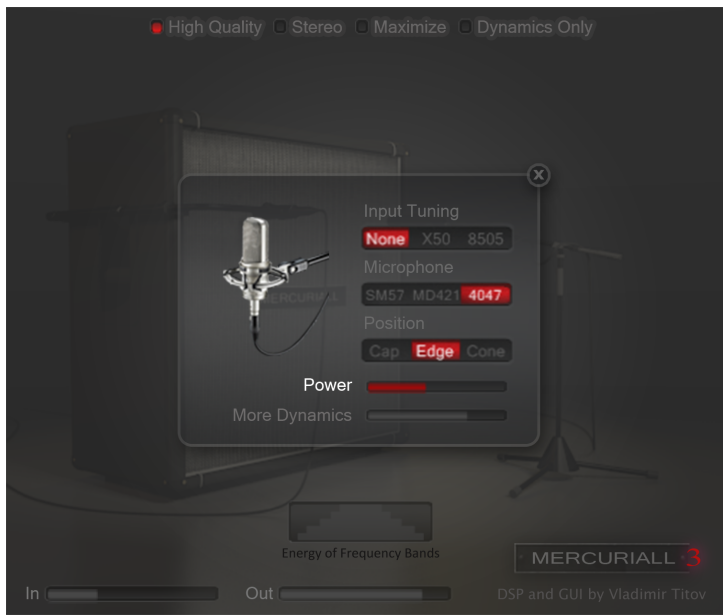
3) When you run the DAW (Reaper, Cubase and others ..) and when it detects a new plug-in, DAW open a window in which you must select a folder with a set of energy-dependant impulse responses:



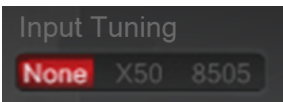
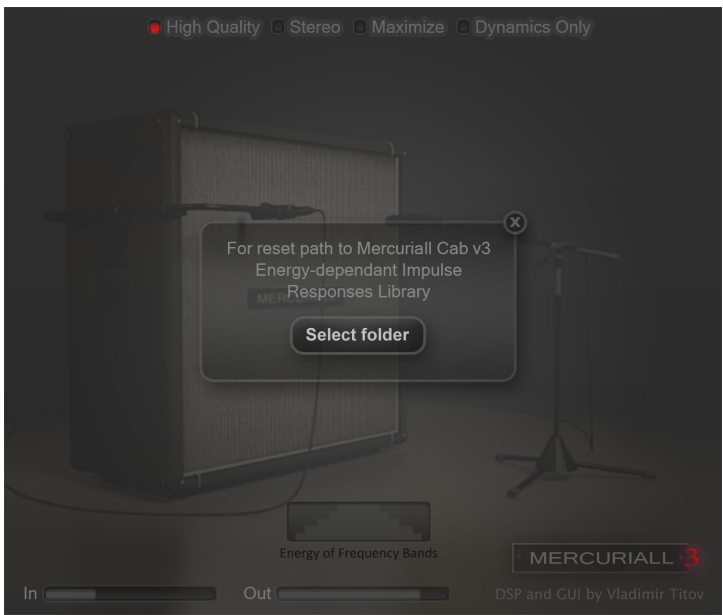
Files from the set was created exclusively for Mercuriall Cab and can't be used as regular impulse responses. You can see what is inside the files, but change the content or overwrite files in audio-editor will damage them, because additional information will disappear, which is necessary for correct operation of the plugin. This information is stored in headers of files. Audio-editors don't save this data.

Graphic User Interface

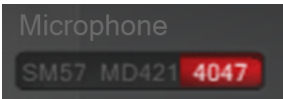
Main window



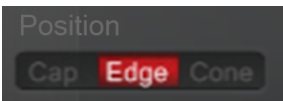
Additional window



Switch to specify which of the preamplifier is used before Mercurial Cab in a chain of plug-ins. Use None - when used tube preamp from Peavey 5150 or any ampsim. If you use X50 by Oqel, then select X50. If you select X50, the input signal will be adapted to make it closer to the signal from a real Peavey 5150 TT Platinum. If you are using 8505 by NickCrow, then choose the mode of 8505. The settings for plugins X50 and 8505 are located in the library folder. Using these settings will give the most natural sound close to the signal from the actual microphones.



Switch to specify modeling microphone: Shure SM57, Sennheiser MD421-II и AudioTechnica 4047.



Switch to specify microphone position relative to speaker.



Output level of power amplifier



The level of additional signal that is added in excess of the calculated rate, which is formed on the basis of the convolution of input signal and impulse response. The impulse response is formed in real time based on the energy of frequency bands.



Operating mode switch. When enabled, the plugin works with high quality. In high quality mode the input signal level affects the simulation result. Correct input level leads to a better modeling.



Switch the plug in the stereo / mono mode. In stereo mode the left and right channel input is processed separately, with each channel to apply the same settings.



Maximize the switch do not affect the quality and the simulation result,

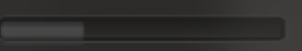
but the effect on the overall output level. Maximize the switch is designed to help the user find the appropriate level of Power. When enabled, it aligns the maximum signal level when changing the Power, which allows the user to better hear the change in sound.

In the off state, the output signal level varies in the same way as varies the signal level received from the microphone during a change input level of sending to the poweramp of Peavey 5150.

☐ Dynamics Only

Mode, in which the output is only the convolution of the input signal and impulse response formed in real time based on the energy of frequency bands. Frequency response and output level varies non-linearly, depending on the energy of frequency bands of input and non-linear model derived from the measurement signal path of studio equipment (poweramplifier+cabinet+room+microphone)

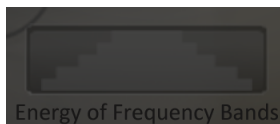
Dynamics Only mode is intended to assist proper setup the input signal level. How to use this mode below in the "Modeling".

In 

The controller of input signal level.

Out 

The controller of output signal level.



Indicator showing the energy levels of the input signal. The upper bands correspond to the energy levels of high-frequency, mid - mid-range level, lower - the energy level of the lower frequencies. Used 5 frequency bands:
from 11,025kHz to 22,05kHz
from 5,512kHz to 11,025kHz
from 2,756kHz to 5,512kHz
from 1,378kHz to 2,756kHz
from 0Hz to 1,378kHz.



Button to switch from the main window to secondary, and back, from the secondary to the main.

Select folder

Button to change the search path to libraries of energy-dependent impulse responses for Mercuriall Cab v3.0. Useful if you need to specify a different location to the library. You may also need it in the future, if will be present new library of models with more successfully matched positions of microphones.

Modeling

For the most accurate simulation you need to fulfill several conditions:

- Use one of the three preamps: a real tube Peavey 5150, software emulator X50 from Onqel (http://www.theserinaexperiment.net/plugins/TSE_X50_B3.zip) or 8505 from NickCrow (<http://sites.google.com/site/nickcrowlab/>). In the Input Tuning section to select the appropriate type of input signal: if you use a tube preamp, specify None, if the plug-in X50 or 8505, respectively, then specify X50 or 8505. Use of other amplifiers is possible. So for example advise to use Anvil ampsim by Ignite Amps (<http://www.igniteamps.com/en/audio-plug-ins>) with Input Tuning set to NONE.
- Set the settings on the amplifier as shown in the images attached to folder of energy-dependant impulse responses library. Do not forget to turn off the poweramp section (in the plug X50) or decrease the master output (in 8505 to make a small value of POWER AMP).
- Adjust the send level to the input amplifiers. The peak value at the input level should be about 0 dB.
- Adjust to Mercuriall Cab input signal (control In). The values on the indicators of the energy levels of frequency bands should not greatly exceed the maximum values, but the peak values must be maximized. At the same time the indicators should not show the maximum values.
- Switch Dynamics Only must be turned off.

Everything else is changing on your taste. Correction of sound made by conventional methods, as if you were working with a recorded track from a microphone. Equalizers, compressors, reverbs, and everything else used in the chain of effects after Mercuriall Cab.

The quality of simulation depends on the correctness of the choice of input levels. To find the correct input level mode, use the Dynamics Only mode. Dynamics Only mode only works when High Quality enabled. In this mode you can monitor additional nonlinear signal which is added to the linear model of the cabinet. The process of setting the input level consists of several steps:

- Enable Dynamics Only mode. Set Power knob to maximum value. Additionally, you can set More Dynamics knob to maximum value.
- Increase or decrease the input level. Produce a sound, like power-chord E5, on the thick strings. Attack of the mediator shall be the maximum.
- The sound of a chord do not turn off by palm mutting, sound must decay itself.
- If successfully selected input signal and made the correct sound, then you will hear the increase the output level when the energy of the upper frequency bands (shown on the bar top) will be minimal. Also with a strong attack, the signal must be subjectively quieter than at the time of decay. Thus, the signal must gradually grow to a certain point, and only after the growth signal should begin to fade.
- If you have achieved the desired effect, disable Dynamics Only mode and set the Power to your taste. Also adjust More Dynamics in the lowest position or adjust it to your taste.
- If you can not achieve desired effect for all values of the input signal level, you will need to adjust the spectrum of the signal of amplifier using the equalizer to maximize the similarity in sound to the Peavey 5150, X50 or 8505 with the settings specified in the attached images located in energy-dependant library folder.

Technical requirements

- CPU must support SSE3 instruction set.
- Audio editor with VST 2.4 support (Reaper, Sonar, Cubase and other).
- Sound Card with ASIO support.
- Sampling frequency in the settings of your sound card should be 44100Hz. The plugin is designed to work with a sampling frequency 44,1 kHz. Perhaps future versions will support 48 kHz and 96 kHz.
- Approximately 160Mb of RAM for each separately running copy of the plug-in 32bit system. If you want to use simultaneously 4 copies of the plug-in (for processing of four mono tracks), you will need at least 640Mb of free RAM.

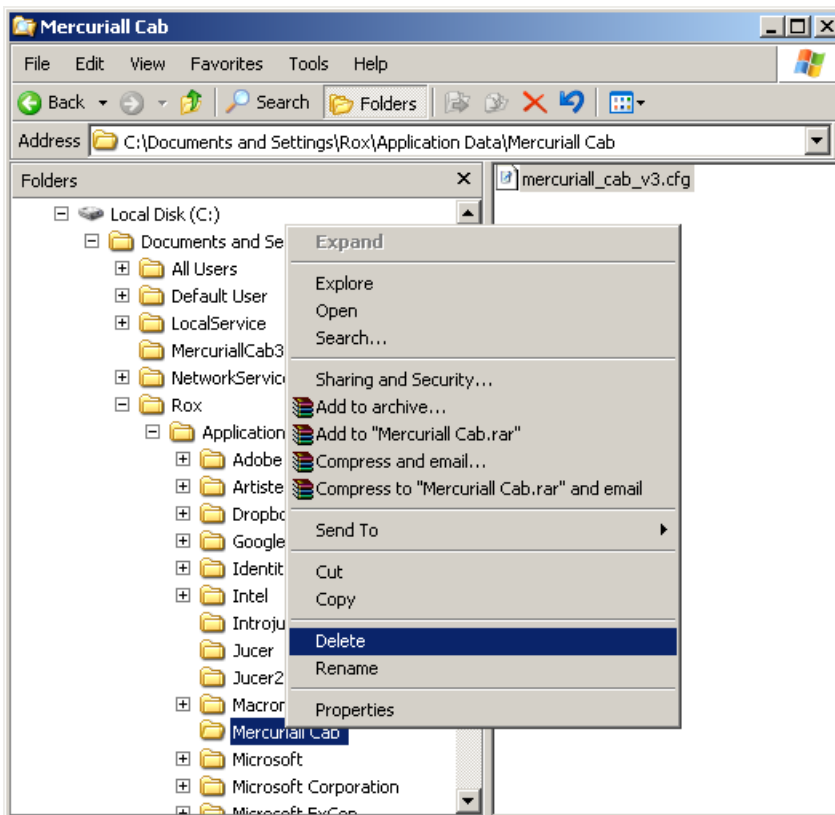
Troubleshooting

Usually most of the problems with the launch of plug-in caused by incorrect downloading an archive library of energy-dependent impulse responses from the internet. You have to be completely sure that the library is downloaded properly, so use a download manager that knows how to correct mistakes of downloading files and continue downloading in the event of a disconnection from the server.

After downloading and unpacking the library, delete the old library folder. If the plug-in does not find the folder with the library, then prompt you to specify the library folder.

Also, you may need to remove the plugin configuration file. It is created automatically in the user directory, for example, in Windows XP, this directory:

«C:\Documents and Settings\[User Name]\Application Data\Mercuriall Cab» (in other OS folder will be different)



If you delete this directory or configuration file «mercuriall_cab_v3.cfg», then the next time, while starting DAW, Mercuriall Cab plug-in prompt you to select the location of a folder with a library of energy-dependent impulse responses and store the path to the folder in the configuration file.

Acknowledgments

I thank everyone who participated in the discussion of the previous version of the plug, especially from the forum of site guitarplayer.ru, and those who were waiting for the new version. I also thank the developers Alain "LePou" Poulin and John "Onqel" Johansen, as well as NickCrow that his example and success in modeling guitar amplifier modeling inspired me to creation of this plug-in. Also i thank Alexander «Stepaneck» Stepashkin for participation in the project. All work on the measurements were made in the studio of Alexander. Without his participation plugin would have remained just an idea.

Contacts

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Ampsim X50 by John "Onqel" Johansen you can download from http://www.theserinaexperiment.net/plugins/TSE_X50_B3.zip

Ampsim 8505 by NickCrow you can download from site <http://sites.google.com/site/nickcrowlab/>