DiBiQuadro

4
JupiterXTC

USER MANUAL

INDEX

Thanks for purchasing DiBiQuadro JupiterXTC. This is the result of a meticulous engineering design, passion for perfection and unforgiving comparisons with analog counterparts.

Please take your time to read carefully the content of this manual before using the plugin and the renderer.

His Majesty, the Bringer of Joy

JupiterXTC is the representation of all the best characteristics of modern and vintage amps, the final pleasure for any guitar player. It delivers three independent preamp channels, each one featuring its own EQ section (contrary to only two of its hardware counterpart) and multiple switching options, including the Plexi mode to engage that classic British feel.

Non-Plus-Ultra Preamp

JupiterXTC preamp features a built-from-scratch 64-bit engine which is based on general purpose hi-quality algorithms and the most recent non-linear models. Particular attention has been put on the definition of the Non-Linear Solver to get the maximum quality and realism, without losing

details in favor of performances (Double-Precision Non-Linear Computing).

Also, JupiterXTC brings a completely new philosophy to the table: being able to shape your tone by giving total access to the circuit components. Managing each gain stage level, shaping the tone-stacks or modifying the tubes characteristics: there is virtually no limit to what you can achieve with JupiterXTC!

Pwr/Cabs: Non-Linear Convolution

The chain made of tube power amp, cabinet/speaker, microphone, high-end studio preamp is sampled together as a unique block to preserve the correct interaction between the specific power amp and the speakers. Contrary to what is commonly used in the amp simulation market we use Non-Linear Convolution (NLC) to capture the harmonic distortion of the power amp, the speaker break up, and the harmonic distortion introduced by the high-end mic preamp.

This is not possible using the commonly spread approach of a single IR. First, with a single IR is impossible to reconstruct the non-linearities of an analog chain. Since the power amp is generally modeled in the competitors

products, the main problem is the missing non-linearities coming from the speaker and the microphone preamp. While this is somehow negligible for some types of high wattage speakers when dealing high gain sounds, it is essential when the speaker break up is part of the tone. Second, most of the times a solid state power amp is used to sample a speaker behavior. This power amp despite being considered "neutral" has its own character due to the different impedance and interaction with the speaker compared to the tube amp we generally want to capture.

The NLC engine, based on 64-bit (double precision) processing allows up to 40 kernels (harmonics). The amount of kernels is selectable.

Another limit of many well-known products on the market is the complete absence of power amp clipping. This aspect is not only provided by our Pwr/Cabs but a complete sets of parameters allows the full control over the power amp headroom, the type of clipping and the interaction of the negative feedback with the Depth and Presence knobs. This is essential to determine the amount of signal used in the tone shaping after the power amp starts to saturate. The power amp saturation adds harmonics to the kernels already applied by the NLC engine.

DNC+

The proprietary solutions described in the previous paragraphs are grouped under a common acronym: DNC+ (Double-Precision Non-Linear Computing and Convolution).

Double-Precision Non-Linear Computing and Convolution

About (db)²

DiBiQuadro is the result of the joint forces of two Italian Software Engineers with more than 15 years of experience in several industries including Biomedical, Military, Insurance, Travel, Telecommunications and Pro Audio.

Our purpose is to deliver superior results in the Audio market with ground breaking technology and nice user-friendly graphic interfaces.


DiBiQuadro full logo

DiBiQuadro compact logo

Input processing

JupiterXTC – Plugin or Renderer – has been designed to process exclusively mono sources. Therefore, a dedicated instance of JupiterXTC has to be applied to each guitar signal.

GUI: tooltips and Edit Mode

The graphic engine conception has a purpose in mind: keeping a clear indication of the status of the elements without altering their 3D rendering on the scene. Tooltips serve this purpose perfectly especially when dealing with knobs status. A typical approach would be to compress the height of the knobs trying to prevent the user to commit parallax errors. As a side effect the graphic designer would be forced to take into account this constraint by limiting the 3D depth of the scene.

Another good reason to use a tooltip-based approach is to allow the update of the knobs status by using an Edit Mode.

The tooltip

EDIT mode
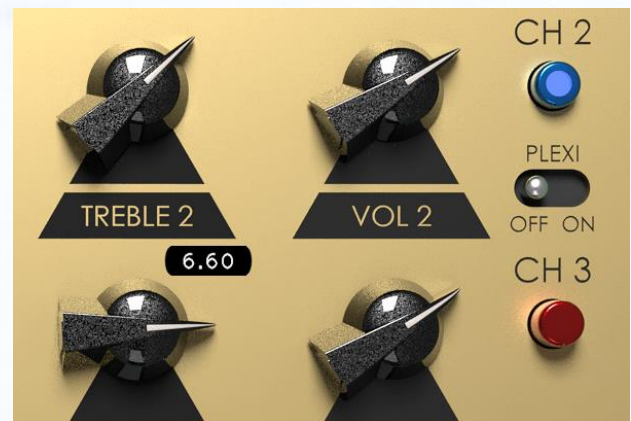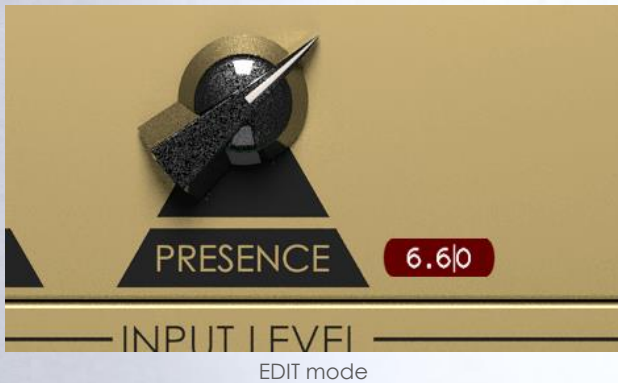
When using a state-of-the-art system – see minimum requirements on DiBiQuadro website – JupiterXTC GUI is able to deliver more than 60 FPS at a reasonably low CPU usage for a super fluid knob tweaking and a hyper realistic and fast meter response.

Controls

CH1 (GREEN). The clean channel: from sparkle and crystalline to crunch, with excellent attack; it fears no comparison.

CH2 (BLUE). From crunch to mid/hi gain tones, the heart and soul of JupiterXTC, this is where the jaws drop and skirts lift. Full of dynamics, harmonically rich and satisfying.

CH3 (RED). The hi gain lead channel. If you search that beautiful overdriven and full of harmonics tone, here you have it.

BOOST. Each channel can be boosted independently (with the exception of the Blue channel with the Plexi mode engaged).

PRE EQ. Each channel provides this switch. N means normal, B1 is bright (more presence) and B2 is even brighter.

STRUCT. It is the gain structure selector for channel 2 and 3. V stands for Vintage, low gain structure, M stands for Modern with more gain.

GAIN. This knob adjusts the amount of gain of the selected channel.

TONE-STACK. Simply Bass, Mid, Treble: there is one independent tone-stack for each channel.

VOL. This knob represents the channel volume of the preamp. Since it is part of the circuit it affects the general tone of the channel.

DEPTH/PRESENCE. Depending on the selected Pwr/Cab these controls may be present or not in order to tweak respectively the bottom-end and the top-end of the power amp section.

INPUT [dB]. This knob adjusts the amount of signal entering the plugin. It can be used as a clean boost before the preamp and safely pushed beyond the 0dB because there is no clipping between the INPUT knob and the preamp circuit. The INPUT LEVEL meter displays the amount of signal in input and it is directly affected by this knob.

OUTPUT [dB]. This is a clean volume knob on the general output of the plugin. Use this control to properly feed the next plugin in the chain without affecting the tone of JupiterXTC. The general output level is displayed by the OUTPUT LEVEL meter.

LOAD/SAVE. The LOAD button opens a window to select a previously saved preset – this includes knobs, buttons, switches, SIZE, TWEAK and SET settings –. The SAVE button allows to save a file containing the current settings of the plugin.
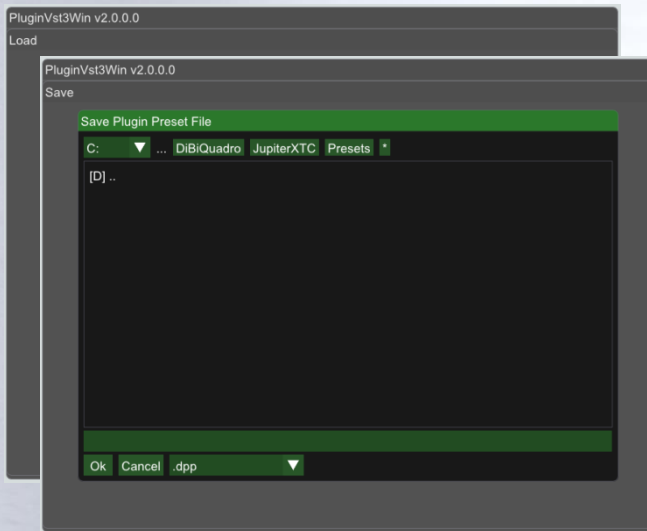
LOAD and SAVE windows

PREV/NEXT. Use these buttons to browse back and forth through the preset files.

SET/PREAMP/HEAD/POST. Please refer to the dedicated sections.

Here some useful tricks to interact with the GUI:

- use "CTRL + click" on a knob to reset the value to its default;
- use the mouse wheel on a knob for fine adjustments;
- press SHIFT while moving a knob to fine adjust.

Edit Mode

The Edit Mode is accessible by double clicking on a knob. Once done, you can edit the value by using arrows, digits and ".", "+", "-" keys. INSERT key is supported too: INSERT status is recognizable by checking the cursor inside the tooltip ("|" means INSERT disabled, "_" means INSERT enabled). After modifying the value press ENTER to commit or ESC to roll-back to the latest value before entering the Edit Mode.
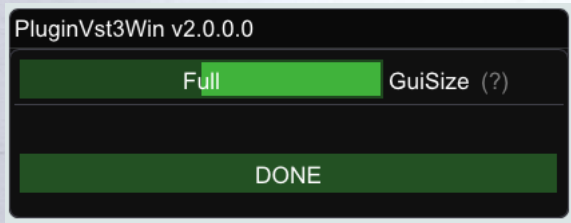
Resize GUI

Only on Windows OS GUI is resizable by right clicking on the GUI itself and selecting one the available options. Two options are available:

- Normal
- Full

On macOS the GUI size is automatically selected depending on the screen resolution so this feature is not necessary.

Resize GUI window (only Windows)

SET

SET window

You can open the SET window to access the configuration settings for Gate, Shaper, Preamp, Pwr/Cab, PostEqualizer, meters, ReSampler, PreRender.

RESET. It restores the default values for all configurations in the SET window.

States. They enable / disable the various elements of the plugin.
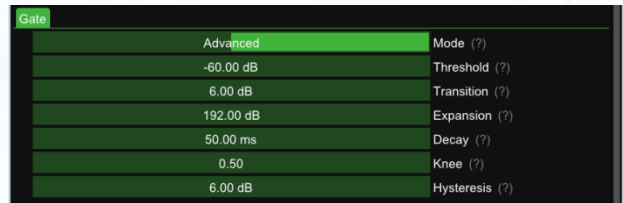
LEDs. It activates/deactivates the meter LEDs.

IOPanel. This section allows to invert the phase of the input signal (INPUT Phase) and the output signal (OUTPUT Phase).

Gate. This tab appears when the Gate is enabled in the States section. Two modes are available: Simple and Advanced.
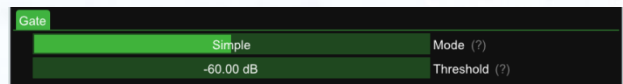

Gate tab in Simple mode

Gate tab in Advanced mode

Gate in **Simple** mode**.** A single parameter of threshold to set the level at which the gate starts to be applied. The remaining parameters are set to default values and hidden.

Gate in **Advanced** mode**.** It displays all the gate parameters. **Transition** can be used to apply a gradual gain reduction when the signal is below the threshold (0 for hard gate); **Expansion** is the maximum gain reduction when the signal is below the threshold; **Decay** controls how quickly the signal fades out when it is below the threshold; **Knee** sets how hardly the gate switches from ungated to gated signal (0 for Hard Knee, 1 for Soft Knee); **Hysteresis** prevents the gate from immediately re-
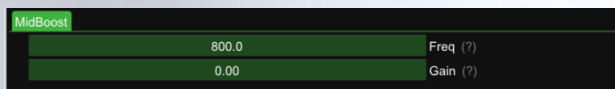
opening after passing below the threshold, to avoid gain flickering.

LoCut. This tab appears when the Shaper state is set to LoCut. It just contains two 12dB/oct loCut filters (Freq and Q). Particularly useful when dealing with boomy signals.
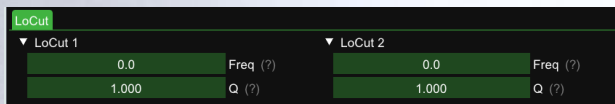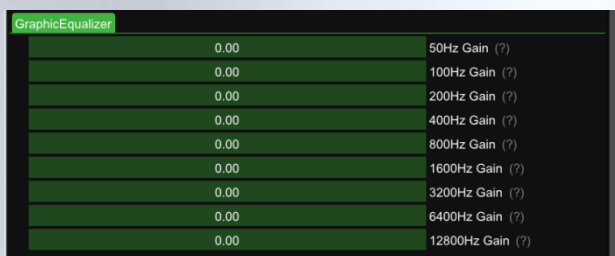

LoCut tab

MidBoost. This tab appears when the Shaper state is set to MidBoost. Use it to push the preamp on the mid frequencies.


MidBoost tab

GraphicEqualizer. This tab appears when the Shaper state is set to GraphicEqualizer. Each of the nine available bands can be boosted or cut of up to 15dB.


GraphicEqualizer tab

ParametricEqualizer. This tab appears when the Shaper state is set to ParametricEqualizer. If the previous shaping options were not enough, this tab offers two 12 dB/oct loCut filters (Freq and Q), two 12 dB/oct hiCut filters

(Freq and Q) and 6 bell bands (Freq, Gain and Q).
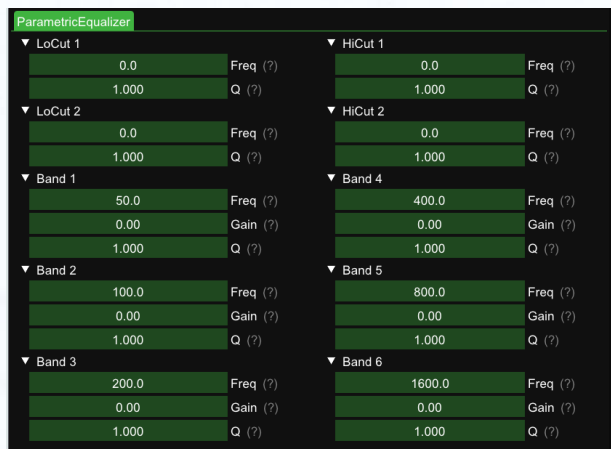
Compressor tab in Simple mode

Compressor. This tab appears when the Shaper state is set to Compressor. If you wish to add a touch of compression to your signal before hitting the preamp, this is what you are looking for. Two modes are available: Simple and Advanced. Both modes report a GainReduction indicator in dB.
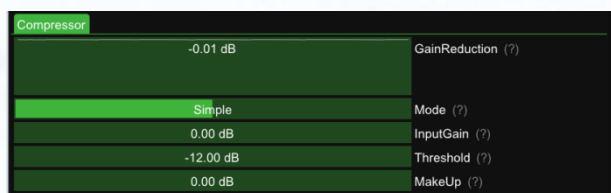
Compressor tab in Simple mode
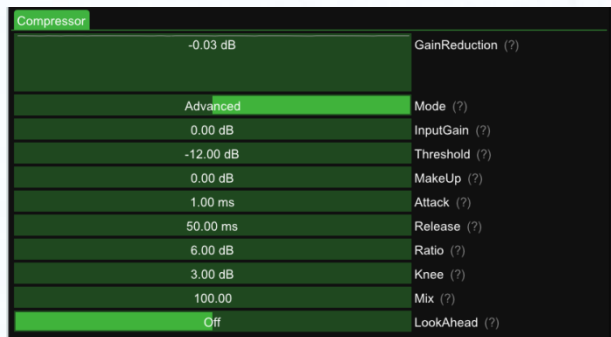
Compressor tab in Advanced mode

Compressor in **Simple** mode**.** Three parameters are available: **InputGain**

adjusts the level of the signal before any compression happens; **Threshold** adjusts the level above which the compressor starts attenuating the input signal; **MakeUp** adjusts the level of the output signal after the compression has been applied. All the other parameters are set to default values and hidden.

Compressor in **Advanced** mode. In addition to the parameters available in the Simple mode, the following ones are displayed: **Attack** sets the time that determines how fast the compression will set in once the signal exceeds the threshold; **Release** sets the time that determines how fast the compressor will recover from the gain reduction once the signal falls under the threshold; **Ratio** determines how much the signal is attenuated above the chosen threshold; **Knee** gives a rounder compression curve when set higher than 0 (0dB: hard knee); **Mix** balances the mix between the dry and processed signal (100%: Wet / 0%: Dry); **LookAhead** enables the compressor LookAhead and shows the **LookAheadDelay** parameter.

RealTime and OffLine tabs. These tabs allow the user to specify different configurations for the ReSampler depending on the current processing mode.

RealTime tab. This mode is applied by your sequencer when you are using a plugin for monitoring, or when you are playbacking tracks. We suggest to keep the UpSamplingFactor at 1x in case of monitoring, 4x in case of playback @ 44100/48000Hz, 2x in case of playback @ 88200/96000Hz.

OffLine tab. This mode is set by your sequencer when you are bouncing a track or the complete mix. If the elaboration time is not a constraint for you and you need to render hi-gain guitars, we suggest to set the UpSamplingFactor to at least 128x @ 44100/48000Hz, 64x @ 88200/96000Hz in order to minimize the aliasing artifacts and get super high-quality distortion. Try also to set a very high PreRenderFactor (32x) to stabilize the model in advance. **For very long renders, we strongly suggest to use JupiterXTC Renderer in command line mode**.
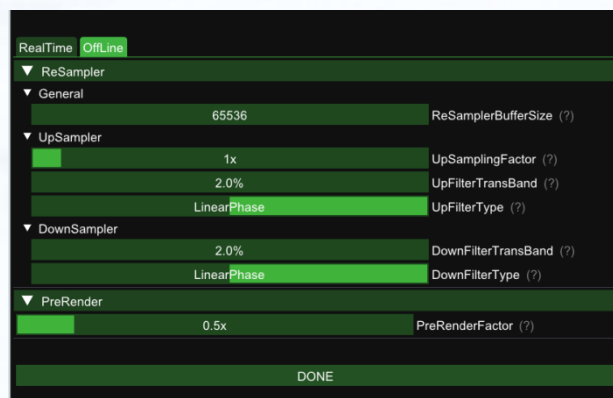
SET window – OffLine tab

ReSamplerBufferSize. This is the ReSampler Buffer Size in number of samples.

UpSamplingFactor. This is the UpSampling Factor applied to the base input SampleRate. Use it to increase the quality or your playbacks and renders, but take into account that high

UpSampling factors correspond to more samples to be processed, and consequently longer processing times.

UpFilterTransBand. This is the UpSampling Filter Transition Band, in percent of the spectral space of the input signal between filter's -3 dB point and the Nyquist frequency.

UpFilterType. It defines the UpSampling filter's phase response: Minimum Phase or Linear Phase.

DownFilterTransBand. This is the DownSampling Filter Transition Band, in percent of the spectral space of the output signal between filter's -3 dB point and the Nyquist frequency. If you are working at sample rates higher than 44100/48000Hz, we suggest to increase it to 43% to have a smoother low pass filter without impacting the audible frequencies.

DownFilterType. It defines the DownSampling filter's phase response: Minimum Phase or Linear Phase.

PreRenderFactor. Together with input SampleRate and UpSamplingFactor, PreRenderFactor affects how many samples will be pre-rendered by the model before the real processing. We suggest to set it to the highest value – 32x – in Offline mode.

**DONE**. It closes the SET window.

PREAMP
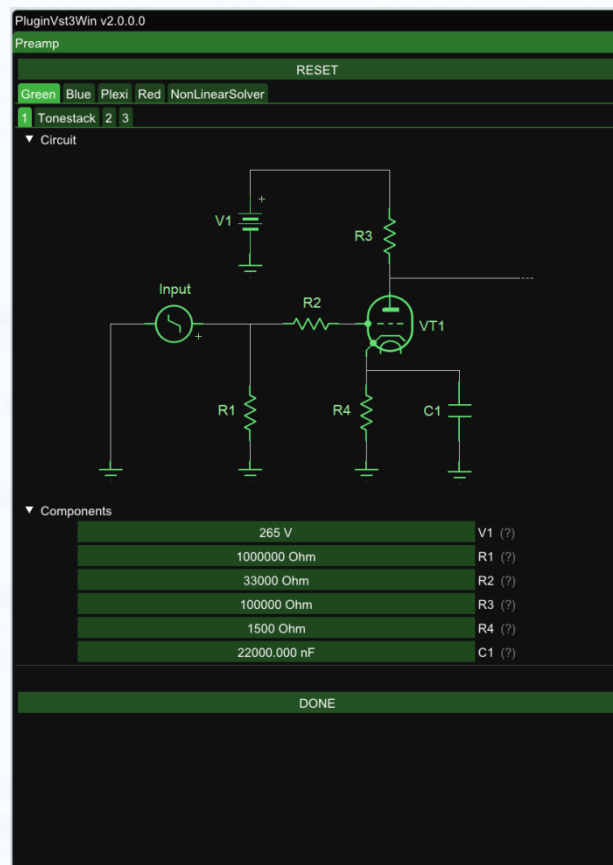
PREAMP window

The PREAMP window gives you the power to modify every single component of the circuit. Even the Triode model of the 12AX7 can be tweaked in the NonLinearSolver tab. Play with this window very carefully, possibly in front of an analyzer, to get exactly what you are looking for. We **do not** guarantee that any possible combination of values makes sense, so it's up to you to find a configuration that works and satisfies your needs.

RESET. It restores the default values for all configurations in the PREAMP window.

Primary tabs. The primary tabs provide access to the different channels of the circuit and to the 12AX7 triode model. Each channel can be tweaked independently, while there can be only one triode model for all triodes of JupiterXTC.
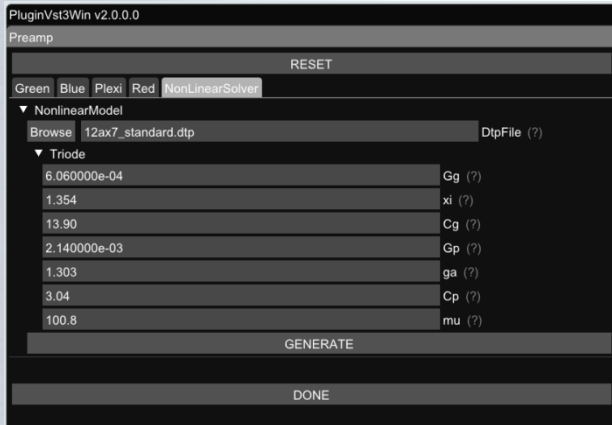
PREAMP window – NonLinearSolver tab

NonLinearSolver tab. Use this section to change characteristics of all the triodes in the preamp. It is the most advanced and consequently the least user-friendly feature. Browse button opens the dialog window to select an existing dtp file. The dtp file contains the triode characteristic. The first time a file is selected, it is necessary to generate the look up tables (LUTs) for that triode by pressing GENERATE. Change the name in Browse text input to save a new dtp file and then press GENERATE.

The generation has to be done each time the triode parameters are modified in order to make them effective.

Once the LUTs are generated they are stored in files in the same path of the dtp file and automatically loaded when selecting the dtp file with the Browse button / dialog window.

To create a new triode characteristic follow these steps:

1. Modify the name in the DtpFile textbox.
2. Change one or more parameters of the triode model[1].
3. Press **GENERATE** button.

DONE. It closes the SET window.

If you accidentally overwrite the characteristics of the factory triodes we recommend reinstalling the product from Center.

PWR/CAB

The PWR/CAB section allows to quickly switch between 8 preloaded Pwr/Cabs. A Pwr/Cab is the non-linear representation of the chain including:

1. the power amp
2. the cabinet with the speaker
3. the microphone to capture the sound of the speaker
4. the high-end mic preamplifier

A Pwr/Cab with only the power amp is also provided: use this Pwr/Cab to experiment with "larger than life" clean

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[1] Have a look at https://www.dafx.de/paper-archive/2011/Papers/76_e.pdf for more details.

sounds, or to drive an external IR (in this case an IR loader is necessary).

JupiterXTC comes with 25 selectable Pwr/Cabs:

JupiterXTC_000_100W_EL34
JupiterXTC_001_100W_EL34_60A_1_T75_57_B73
JupiterXTC_002_100W_EL34_60A_1_T75_201_B73
JupiterXTC_003_100W_EL34_60A_1_T75_421_B73
JupiterXTC_004_100W_EL34_60A_4_T75_57_B73
JupiterXTC_005_100W_EL34_60A_4_T75_201_B73
JupiterXTC_006_100W_EL34_60A_4_T75_421_B73
JupiterXTC_007_100W_EL34_60A_2_V30_57_B73
JupiterXTC_008_100W_EL34_60A_2_V30_201_B73
JupiterXTC_009_100W_EL34_60A_2_V30_421_B73
JupiterXTC_010_100W_EL34_60A_3_V30_57_B73_A
JupiterXTC_011_100W_EL34_60A_3_V30_201_B73_A
JupiterXTC_012_100W_EL34_60A_3_V30_421_B73_A
JupiterXTC_013_100W_EL34_60A_3_V30_57_B73_B
JupiterXTC_014_100W_EL34_60A_3_V30_201_B73_B
JupiterXTC_015_100W_EL34_60A_3_V30_421_B73_B
JupiterXTC_016_100W_EL34_60B_1_M25_57_B73
JupiterXTC_017_100W_EL34_60B_1_M25_201_B73
JupiterXTC_018_100W_EL34_60B_1_M25_421_B73
JupiterXTC_019_100W_EL34_60B_3_M25_57_B73
JupiterXTC_020_100W_EL34_60B_3_M25_201_B73
JupiterXTC_021_100W_EL34_60B_3_M25_421_B73
JupiterXTC_022_100W_EL34_60B_2_H30_57_B73
JupiterXTC_023_100W_EL34_60B_2_H30_201_B73
JupiterXTC_024_100W_EL34_60B_2_H30_421_B73

The power amp sampled is 100Watt 4xEL34 tubes.

Two cabinets are avaible: slanted 60A loaded with T75s and V30s and straight 60B loaded with M25s and a H30 speakers. A sequential number from 1 to 4 indicates which speaker has been sampled: 1 and 2 are the top left and right while 3 and 4 the bottom left and right respectively.

A hi-end mic preamps was used: the B73 is a top notch preamplifier that set the standard for modern recordings.

All Pwr/Cabs are phase aligned (with the sole exception of the Pwr/Cab including only the power amp).

PWR/CAB LOAD. Pwr/Cab Load gives access to the 8 slots on the GUI. Browse opens the window to select the Pwr/Cab path, while Void cleans up the slot. When a slot is void the output is taken directly from the preamp if enabled. While the output of the preamp section is not bounded by any volume limit and can be used to drive subsequent plugins (ie: another JupiterXTC), the output of a Pwr/Cab is protected by a safety mechanism that clips the signal when above 0dB.
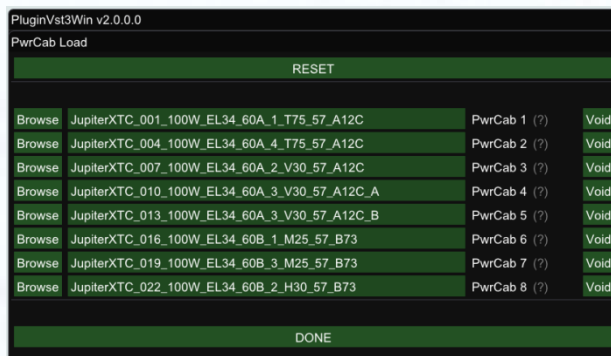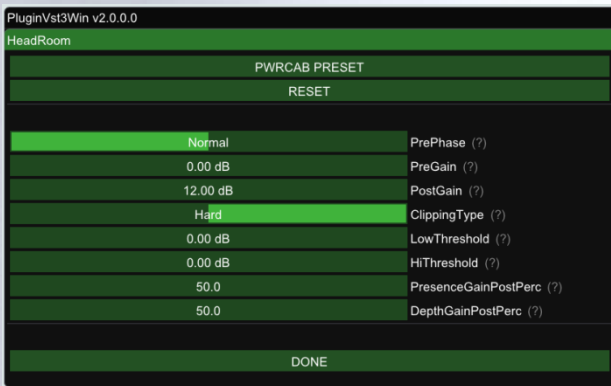

Pwr/Cab LOAD window

PWR/CAB SET. With Pwr/Cab Set you can select the number of harmonics in the Pwr/Cab section:

- Standard: 10 harmonics
- High: 20 harmonics
- Ultra: 30 harmonics
- Non-Plus-Ultra: 40 harmonics
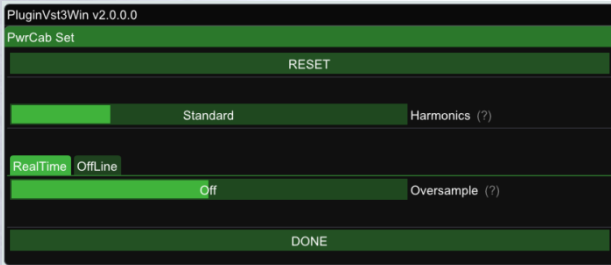
Pwr/Cab SET

HEAD

HEAD window

Head (HeadRoom) is a powerfull tool to shape the behavior of the power amp section including the type of clipping when pushed to the limit (soft/hard, symmetrical/asymmetrical) and the effect of depth and presence when power amp is working in the non-linear region. Each Pwr/Cab has its own setting.

PWRCAB PRESET. It restores the factory preset for the selected Pwr/Cab.

RESET. It restores the values to the general default values.

PreGain. It sets the level of the signal in input to the power amp.

PostGain. It defines the level of the signal coming out of the Pwr/Cab.

ClippingType. Soft/Hard.

LowThreshold/HiThreshold. These can be used to set the clipping thresholds of negative and positive half waves respectively: use different values for asymmetrical clipping and identical values for symmetrical.

PresenceGainPostPerc/ DepthGainPostPerc. Percentage of Presence and Depth effect after power amp clipping. They affect the behavior of Presence and Depth only when power amp is saturating.
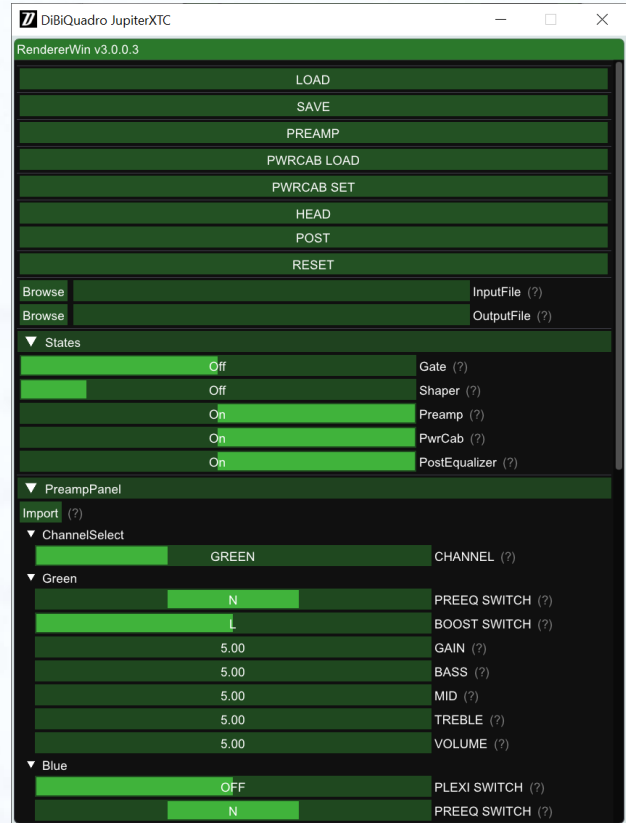
POST

POST window

Post (PostEqualizer) is a handy minimum-phase equalizer at the end of the signal chain, with the same bands of the ParametricEqualizer available in the Shaper section.

PWRCAB PRESET. It restores the factory preset for the selected Pwr/Cab.

RESET. It restores the values to the general default values.

The Renderer

Renderer window

The Renderer is provided to process an input wave file in OffLine mode. It collects all the controls described in the previous sections, plus you have the possibility to specify **input and output files**.

Use the **LOAD** and **SAVE** buttons to load and save Renderer presets. The **Import** button can take a specific panel setting from a JupiterXTC plugin preset file. There is also an additional **Output** header which allows to specify the output wave file format.
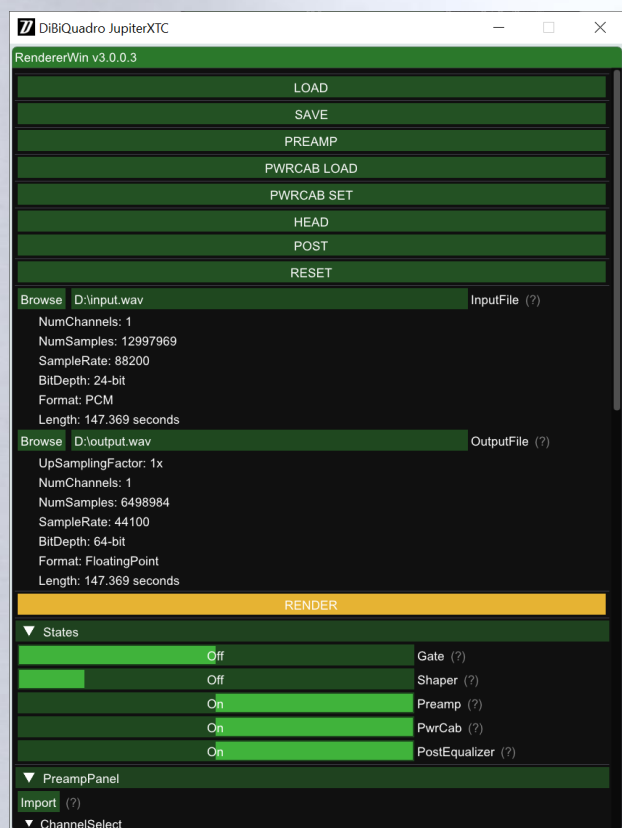

Renderer – Output header

OutputBitDepth. This is the number of bits of information in each output sample. It can be 16, 24, 32 or 64-bit.

OutputAudioFormat. It represents the output encoding type: PCM (Integer) or Floating Point.

The **RENDER** button will be **visible only** when an **existing input wave file** and a **valid output wave file name** have been specified.

Renderer – RENDER button

Comand Line Mode

The Renderer can be executed in command line mode. With this functionality, multiple rendering sessions

can be easily triggered in parallel by a Windows batch file.

To launch a render from the Command Prompt, first you need to create a preset for the Renderer. Then you need to execute the Renderer from the Command Prompt with "-c" option and to specify, in order:

1. the full path (absolute or relative path + name) of the Renderer preset;
2. the full path (absolute or relative path + name) of the input wave file;
3. the full path (absolute or relative path + name) of the output wave file.
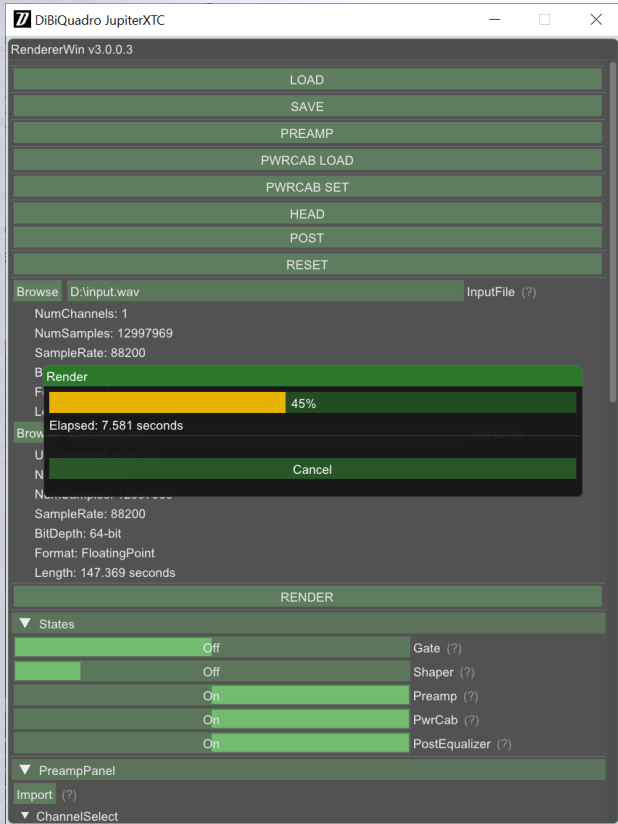
Reminder:

JupiterXTCRenderer.exe –c presetFile.drp input.wav output.wav

```
C:\Program Files\Common Files\VST3\DiBiQuadro\JupiterXTC>JupiterXTCRenderer.exe
-c presetFile.drp input.wav output.wav
```
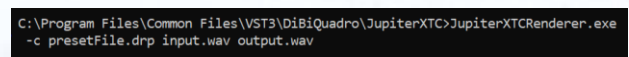
Example of Prompt command

Renderer – Render in progress

DiBiQuadro Audio S.r.l.s.

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$$E=[db]^2$$