Voxengo CRTIV Tape Bus User Guide

Version 1.7

https://www.voxengo.com/product/crtivtapebus/

Contents

Introduction

CRTIV Tape Bus plug-in for professional music production applications recreates characteristic elements of the reel-to-reel tape sound. This includes saturation, modulation noise, and smearing effects which are known for the "analog" feel they bring to audio recordings. This plug-in also applies a selected impulse response taken by us from the existing tape machines. Great for mid-high frequency smoothing.

In CRTIV Tape Bus you can choose between 4 distinct tape impulses, 2 flutter noise modes, and several "overload protection" circuitry modes.

Features

- Saturation controls
- Tape medium controls
- "Overload protection" modes
- 64-bit floating point processing
- Preset manager
- Undo/redo history
- A/B comparisons
- Contextual hint messages
- All sample rates support
- 1 ms compensated processing latency

Compatibility

This audio plug-in can be loaded into any audio host application that conforms to the AAX, AudioUnit, VST, or VST3 plug-in specification.

This plug-in is compatible with Windows (32- and 64-bit Windows XP, Vista, 7, 8, 10 and later versions, if not announced otherwise) and macOS (10.11 and later versions, if not announced otherwise, 64-bit Intel and Apple Silicon processor-based) computers (2.5 GHz dual-core or faster processor with at least 4 GB of system RAM required). A separate binary distribution file is available for each target computer platform and audio plug-in specification.

User Interface Elements

Note: All Voxengo plug-ins feature a highly consistent user interface. Most interface elements (buttons, labels) located at the top of the user interface are the same in all Voxengo plug-ins. For an in-depth description of these and other standard features, and user interface elements, please refer to the “Voxengo Primary User Guide”.

Saturation

This group of knobs affects saturation characteristics of the plugin.

The “Rec Gain” parameter specifies “recording gain” (in decibel) or the strength of the saturation effect. The makeup gain will be calculated and applied automatically. The “F25” – “F150” switches enable “overload protection” circuitry that applies feedback compression-like signal adjustment. The number corresponds to circuitry’s timing in milliseconds. Note that these modes may reduce “punch” of percussive sounds, so these modes are best used for transient smoothing.

The “Hi Emphas” parameter specifies an additional gain (in decibel) applied to the higher frequencies. This parameter models a noise-reduction-like equalization curve used in tape recorders. Such curve produces an effect of over- or under-saturated higher frequencies.

The “Hardness” parameter specifies tape transfer function’s hardness, in percent. Selects between soft- and hard-saturation.

The “Saturate” parameter specifies the amount of saturation, equivalent to the “Dry Mix” control.

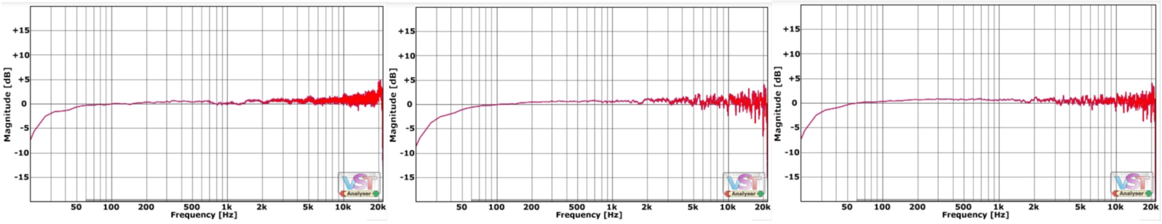
Tape

This group of knobs affects tape medium’s characteristics.

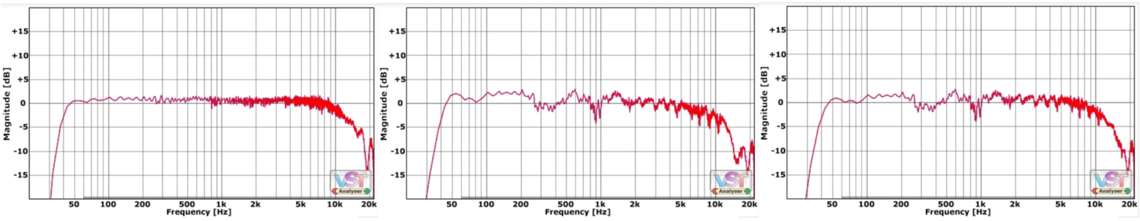
The “Flutter” parameter specifies the amount of flutter noise (side-band noise) which is produced by irregularities of tape’s movement. This noise is best heard on plain sine-wave signals. The flutter noise softens the frequency and transient response, makes it less harsh and sterile, by filling spaces between spectral peaks. However, if you need to retain sharpness of the transient response you may need to reduce flutter. The “Flutter” mode selector selects between “consumer” (wide) and “professional” (narrow) frequency response of the flutter noise. “Pro” mode imitates a high-quality tape drive mechanism.

The “Impulse” selector specifies an additional impulse response applied to the output signal which models the overall frequency response of the tape recorder-tape medium.

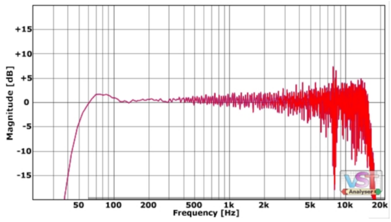
The “Tape 1” impulse and its variations have an almost flat frequency response, with a slight roll-off below 50 Hz.



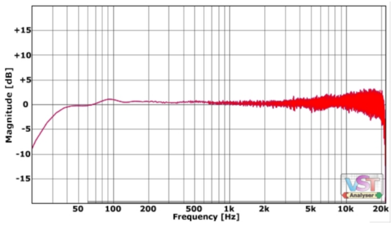
The “Tape 2” impulse and its variations have an almost flat to a bit non-linear frequency response, but with a roll-off above 10 kHz and a strong roll-off below 45 Hz.



The “Tape 3” impulse has a highly non-linear frequency response, with a boost at around 70-100 Hz, with a strong roll-off above 16 kHz and below 60 Hz.



The “Tape 4” impulse has a linear frequency response, with a bump at 90 Hz, roll-off below 40 Hz.



Note that when plugin runs at sample rates higher than 44.1kHz or when oversampling is enabled, the results will be cleaner than what most tape machines deliver. If you want to get a “realistic” tape saturation sound you should run plugin at 44.1kHz without oversampling: at this setting plugin produces aliasing artifacts in the same way a real tape machine does.

Levels

The “Hi Gain” parameter (in decibel) controls the gain of the output high-shelf filter which may be useful when the signal is over-saturated by means of the “Hi Emphas” parameter.

The “Out Gain” parameter controls the master output gain, in decibel.

Meter

This block displays the output signal level in decibel. “OL” indicator reacts on signal levels above 0 dBFS.

Credits

DSP algorithms, internal signal routing code, user interface layout by Aleksey Vaneev.

Graphics user interface code by Vladimir Stolypko. Graphics elements by Vladimir Stolypko and Scott Kane.

This plug-in is implemented in multi-platform C++ code form and uses “zlib” compression library (written by Jean-loup Gailly and Mark Adler), “LZ4” compression library by Yann Collet, “base64” code by Jouni Malinen, FFT algorithm by Takuya Ooura, filter design equations by Robert Bristow-Johnson, VST plug-in technology by Steinberg, AudioUnit plug-in SDK by Apple, Inc., AAX plug-in SDK by Avid Technology, Inc., Intel IPP and run-time library by Intel Corporation (used under the corresponding licenses granted by these parties).

Special thanks go to Michael Kingston, for encouraging us to make the original Analogflux TapeBus plug-in, for discussions, and for providing example tape recording material for analysis.

Thanks go to Christian-W. Budde for VST Plugin Analyzer.

Questions and Answers

Q. Some plug-ins feature a link between the “Rec Gain” and “Out Gain” controls. Why there is no such feature available in Tape Bus?

A. This feature is not available, because Tape Bus applies an automatic makeup gain that depends on the “Rec Gain” and other saturation controls. This usually requires only minor changes to the “Out Gain” in most cases.

Q. What kind of tape machine brands do impulses capture?

A. We can’t name exact brands due to possible trademark violation. Tape impulses capture both professional and consumer tape machines and tapes.

Q. What does the “Hardness” control do?

A. This control adjusts saturation curve from soft- to hard-saturation. This is similar to the “Knee” control available in some compressors.

Q. Some impulses have a severe roll-off of lower frequencies. Do you plan to introduce a separate roll-off parameter?

A. This happens due to a way some tape machines work, they just roll-off the lower frequencies to remove signal’s biasing. Since Tape Bus is impulse-response based, there is no way present to implement a separate low-frequency roll-off parameter. Simply select the impulse which does not have a steep roll-off.

Q. At what sample rate were the impulses recorded at?

A. All impulses were recorded at 44.1kHz sample rate, and are automatically resampled to project’s sample rate using a high-quality sample rate conversion algorithm which retains impulse’s frequency and phase response. The reason impulses were recorded at 44.1kHz is because most tape machines naturally have a 20-20kHz frequency range. Tape medium mechanics can’t record higher frequencies, and in practice produce aliasing artifacts when higher frequencies are being recorded.