
SAWStudio

REVERBERATOR

**PLUG-IN FOR USE WITH
SAWSTUDIO AND SAWSTUDIOLITE**

For PC Compatible Systems
Running Windows NT or Windows 2000

USER'S GUIDE

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OVERVIEW

OVERVIEW

Welcome to the *Studio Reverb* Plug-In Module for the SAWStudio environment. This module will provide you the opportunity to create many different types of room ambience effects directly within the MultiTrack View Window. The design is based on the Comb/Allpass Filter Model. The typical 4 Comb/2 Allpass design has been extended to an unbelievable 20 Comb/20 Allpass design. Each comb filter includes high-frequency compensation in its feedback loop and a sharp cutoff bandpass filter that can be applied to the overall effect. All this adds up to the ability to create room simulations that match the audio fidelity of much more expensive DSP based Reverb units.

The unit is capable of real-time playback and adjustment of all parameters on a Pentium 133 or faster machine (44.1Khz Stereo). This, without the use of any DSP hardware, represents quite an accomplishment.

BASIC OPERATION

The *Studio Reverb* can be patched into any track in the MultiTrack using the *Patch Builder* window. The unit can be opened in a condensed view (for normal selection and operation of pre-built chambers) or in an expanded view (for editing and creation of new chambers).

Clicking the *Edit* button will toggle between the two views. For normal operation, open the list of pre-built chambers by clicking the down arrow to the right of the current chamber name at the top of the display. Click the chamber you wish to use.

- ☞ The chamber names with a -HD suffix are high-density versions. The reverb trails will be much smoother, but because of the higher number of filters used, these chambers will place a higher demand on the CPU.

The sliders directly under the chamber selection control the basic balance and decay length of the current chamber. The decay length is adjusted in seconds. The *Dry* signal level can be adjusted from 0% to 200%. This is the original signal being fed into the chamber. The *Wet* signal level can also be adjusted from 0% to 200% and it represents the processed reverberated signal created by the chamber itself. Be careful not to mix the levels too loud or you might cause distortion within the module.

If your machine is fast enough you may adjust the controls while soloing and playing back the track live. If your machine is not fast enough, try advancing the *MultiTrack Pre-Load Buffers* (found in the *MultiTrack PreLoad* option under the *Window* menu) to a larger number like 60-100 to preview 5-10 seconds worth of sound, or you may temporarily set the MultiTrack *samplerate* to a lower value by clicking on the *Rate* button on the MultiTrack window. (Don't forget to reset the MultiTrack *samplerate* back to its original value when you are through selecting and adjusting the chamber.)

- ☞ To avoid *samplerate* conversion which can affect overall playback performance speed, make sure that your MultiTrack *samplerate* is set to the same value as your soundfiles. If your soundfiles are at 32Khz then the MultiTrack *samplerate* should also be set to 32Khz to avoid *samplerate* conversions.

BASIC OPERATION

In most cases you should process the signal, when you have settled on the effect you want, by either processing the *Studio Reverb* effect directly back to the original file in the MultiTrack or by building a mix of the soloed track to an output track or new sound file.

- ☞ We suggest building the mix using only the *Wet* signal and placing the effected output on another track. You can then use the track fader to control the *Reverb Return* into the overall mix dynamically.

CONTROLS

EDIT

Expands and contracts the view to allow editing of the chamber parameters.

HELP

Invokes the *Help* file.

ABOUT

Displays the *About* box with version information.

NAME

The title of the currently selected chamber.

SLIDERS

These controls adjust values for different parameters. Click and drag the knob for new values. Use the arrow controls on the left side of the slider for fine adjustments. The value is displayed to the right of the slider.

DECAY

Adjusts the decay time of the reverb in seconds. This is a global adjustment for the reverb effect.

DRY SIGNAL

Adjusts the percentage of original signal to be mixed into the output.

CONTROLS

WET SIGNAL

Adjusts the percentage of the reverberated signal to be mixed into the output.

CLOSE

Closes the plug-in window.

UPDATE

Updates the currently selected reverb preset file on the hard drive.

SAVE AS

Saves the current preset with a different filename. Make sure to save all of your presets in the same directory, otherwise the plug-in will not find them. Make sure, also, to rename your new preset with a unique title name in the *Name* field at the top of the plug-in before saving, to avoid overwriting or duplicating an existing preset.

COMBS

Displays the comb filters and lets you edit their parameters (delay, feedback and frequency response).

ALLPASS

Displays the Allpass filters and lets you edit their parameters (delay and feedback).

RESPONSE DISPLAY

Generates a graphical representation of the presently selected chamber. The major ticks represent seconds and the minor ticks

represent 1/10 seconds. The vertical scale is parameter dependent with a maximum value of 32,768 and a minimum value of -32,768.

FILTER DISPLAY

Displays the filter reference lines, with the currently selected filter shown in red.

PREVIOUS

Selects the previous filter for editing. The *left arrow* key performs the same function.

NEXT

Selects the next filter for editing. The *right arrow* key performs the same function.

REVERT

Undoes all the actions on a filter type (Comb or Allpass) since it was last selected.

ADD

Adds a new filter (Comb or Allpass) depending on the current selection. It will be given default initial settings. If the *Response* button is selected this button performs no action.

DELETE

Deletes the currently selected filter. If the *Response* button is selected this button performs no action.

CONTROLS

DELAY

Adjusts the delay of the currently selected filter. This will position the filter reference line in the display.

Pressing the *Shift* key while making this adjustment will offset all other *Comb* or *Allpass* delay times the same amount, keeping the relationship between them intact.

☞ This is a very convenient way to add in some Pre-Delay to the overall chamber design, although be aware it is not quite the same as pre-delaying the actual incoming data. Sliding the filter group to earlier or later times can truly affect the overall chamber sound and this global adjustment feature can make it easy to create many chambers that are spin-offs of some other template.

👉 **If any one of the filter delay times reaches maximum or minimum values, the group will stop moving as a whole and the individual filter you are adjusting will then continue to move out of relationship to the rest.**

FEEDBACK

Adjusts the feedback strength of the currently selected filter. This will set the height of the filter reference line in the display.

FREQ RESPONSE

Adjusts the frequency response of the currently selected filter (only applicable to *Comb Filters*). The higher the value, the more the high frequencies are attenuated.

COMBS ENABLE

If checked, the *Comb Filters* are enabled. If unchecked, they will be bypassed.

ALLPASS ENABLE

If checked, the *Allpass Filters* are enabled. If unchecked, they will be bypassed.

STEREO ENABLE

If checked, a stereo enhancement algorithm is added to both mono and stereo files. If unchecked, stereo files will maintain discreet stereo dispersion and mono files will maintain mono dispersion.

BANDPASS ENABLE

If checked, the *Bandpass Filter* is enabled. If unchecked, it will be bypassed.

BANDPASS LOW

Sets the *Low* bandpass cutoff frequency.

BANDPASS HIGH

Sets the *High* bandpass cutoff frequency.

Modifying the existing chambers or creating your own chambers from scratch can be a fun, though complex process. There are many parameters that affect the overall sound of the chamber and they all interact dynamically. Let's look at each one.

COMB FILTERS

The *Comb Filters* can be selected and displayed by pressing the *Combs* button. *Comb Filters* create the early first reflections of the chamber. Using a single *Comb Filter* can create typical echo delay effects. It usually takes three or more to begin creating the many interactive reflections that simulate natural room ambience.

The *Delay* setting of each *Comb Filter* determines the time to the first reflection of that filter. Larger *Delay* settings simulate larger rooms.

The *Feedback* setting determines the liveness of the room. Larger values cause the first reflection to continue echoing on for a longer length of time.

The *Frequency* response setting also plays an important role in simulating the room liveness by controlling how fast the high frequencies decay. Higher values dampen the feedback, rolling off the high frequencies faster.

Each *Comb Filter* assigned will be displayed as a vertical line in the display window. The height of the line represents its feedback strength, and the position of the line represents its delay time. Longer times move the position to the right.

Most lines will be green, but one will be red. The red line is the currently selected and active *Comb Filter* and the slider controls will reflect its settings. The *Previous* and *Next* buttons can be used, as well as the *left* and *right arrow* keys, to select a different *Comb Filter* as the active one. You may then adjust the sliders to change the response of that filter and the overall response of the chamber.

You may add a new filter using the *Add* button, or delete an existing one using the *Delete* button. Keep in mind that the more filters added, the smoother the overall chamber can become, but the more intensive the demands are on the CPU.

When positioning *Comb Filters*, try to keep the *Delay* times at random intervals such that there are no even multiples of delays that can directly overlap creating peaks and valleys in the overall chamber response (unless of course that is your intent). In other words placing, one filter at .0100s and the next at .0200s could cause unwanted peaks and valleys in the chamber. Try moving one to .0197s.

ALLPASS FILTERS

The *Allpass Filters* can be selected and displayed by pressing the *Allpass* button. *Allpass Filters* create the density and reflection diffusion of the chamber. Without the *Allpass Filters* the individual reflections of the *Comb Filters* may be heard intact, and can create a kind of course and rough sound. By adding the *Allpass Filters* at various delay points in the chamber, individual reflections become diffused and blended together, creating the smooth decay trails that are normally associated with room ambience.

Once again, more can create smoother chambers, but at the expense of CPU time.

The delay times of the *Allpass Filters* are much shorter than the *Comb Filters*, and you can create actual resonant tones by placing them too close together.

BANDPASS FILTER

The *Bandpass Filter* is a sharp cutoff filter that can be applied to the overall chamber, allowing many different effects in overall frequency response. You may adjust the low frequency cutoff and the high frequency cutoff. This filter can be very effective in smoothing or brightening the overall chamber sound texture.

ENABLE CHECK BOXES

The *Enable* check boxes allow you to enable or disable the *Combs*, *Allpass*, and *Bandpass Filters* so that you can compare different combinations. This helps in the editing and creation of chambers.

RESPONSE VIEW

The *Response View* can be activated by clicking the *Response* button. This can be a powerful aid in adjusting all parameters to work together to create the overall chamber sound you are going for.

☞ When using the *Response View*, we suggest setting the *Dry* signal to 0%, which expands the views display for a more detailed look at the actual chamber response.

Clicking the *Response* button will send an impulse through the chamber, calculating an impulse response curve for the specific parameters. You can use this view to visualize peaks and valleys and overall smoothness and shape of the chamber response.

SAVING CHAMBERS

Once you have created or modified a chamber that you like, click in the chamber *Name* text box at the top of the display, and enter the name of the new chamber. Press *Enter* when finished. Now click on the *Save As* button, and create a filename for the new chamber. Be careful not to overwrite existing chambers that you want to keep.

The *Update* button will allow you to modify the existing chamber file without asking any further questions. Realize that this overwrites the current file, which is now replaced by the new settings.

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