

# The Effects

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# Overview

This chapter describes Pulsar effects and shows you how to use them.

Effects devices can be **added to a project** via the Project window, using the usual method of drag-and-drop from the File Browser. An effects device is depicted in the Project window as a module with audio connections. By right-clicking on this module, you pop up a menu via which you can **open the control surface** of the effects device. Via the control surface, you can adjust all settings, **bypass** the effect or call up its **preset list**.



## Insert And Aux Effects

There are two main classes of Pulsar effects: **insert** effects and **aux** effects.

**Insert effects** are intended for direct insertion into the Big Mixer. Each one is provided in two varieties – mono for individual channel inserts, or stereo for main mix insertion. In addition to the usual Project window method of adding an effect to a project, hooking it up and opening

its control surface, an insert effect can also be dragged from the File Browser and dropped directly into a mixer insert slot. Its control surface can then be opened by double-clicking on this insert slot. A display window on the surface indicates the mixer channel into which the associated effect is inserted.



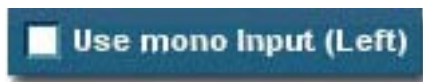
**Aux effects**, as a group, feature relatively complex algorithms compared to those of the insert effects (and are therefore also more demanding of DSP capacity). They're not intended for insertion in several different mixer channels at once, but rather for singular use in a mixer aux path. Each aux effect has a **Connections** drawer which displays the connected signals by name. Cabling can also be done via this drawer – for example, click on the Input-Left window, and then on the Aux Send 1 window in the BigMixer aux section, to connect the mixer aux send to the effect input, etc.



With most effects, the amounts of input (**Dry**) and effect (**Wet**) signal sent to the output can be separately adjusted. The Wet control has its zero-output setting at the center of its rotation. Turning it further to the left again increases the Wet output amount, but with **inverted phase**.



Stereo effects can be applied to mono signal sources to produce a stereo output. To do this, activate the option **Use mono input (left)** and feed the source signal in via the left input.



**External effects** can also be used with Pulsar by connecting them to the card (via analog, S/P-DIF or ADAT I/Os as appropriate) and connecting them via the hardware I/O modules in the Project window.

# Compressors And Limiters

Pulsar includes a compressor and a limiter (each in mono and stereo versions). These are usually used as insert effects and thus can be found in ..\Pulsar\Devices\Inserts.

The compressor responds mainly to the average level of the input signal. The limiter focuses more on signal peaks. User controls are identical for both, as described below.

The individual parameters are:

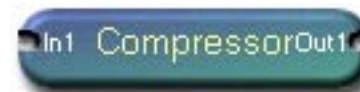
**LA** (Look-Ahead): The compressor/limiter effectively looks into the future, evaluating the input signal ahead of the point where compression is actually taking place.

**Att** (Attack): Compressor/limiter reaction time. Allows the speed of response to input signal peaks (i.e., the rapidity of compression ratio increase) to be adjusted.

**Rel** (Release): Compressor/limiter "relaxation time". Controls the speed with which the compression ratio drops off after the input signal falls below the threshold level.

**Thres** (Threshold): Sets the input signal level above which compression (delayed by the Attack time) begins. When the input signal again falls below the threshold level, compression drops off (after Release time delay).

**Ratio** sets the actual compression ratio. **Gain** adjusts the output level.



In action, the **limiter** is "harder" than the compressor – thus useful when overloading *must* be avoided. Uniquely, the Pulsar limiter offers an adjustable compression ratio.

# Noise Gate

The Pulsar Noise Gate is full-featured but nevertheless requires relatively little DSP power. You can comfortably deploy multiple noise gates in several mixer channels at once. On the control surface, time values (LA, Att, Hold, Rel) are shown in msec, while level settings (Thres, Hyst, Floor, Gain) are in dB relative to the 0 dB maximum.

The individual parameters are:

**LA** (Look-Ahead): The compressor/limiter effectively looks into the future, evaluating the input signal ahead of the point where compression is actually taking place. This setting is especially important with fast attack and release times.

**Att** (Attack): Amount of time for full opening of the gate once the input signal level has exceeded the turn-on (upper) threshold.

**Hold**: Minimum amount of time the gate will stay open once it is triggered (i.e., minimum delay between end of attack and start of release).

**Rel** (Release): Amount of time which gate takes to fully close once it begins to close (i.e., once the input signal level falls below the turn-off (lower) threshold, and after any remaining hold time has elapsed).



**Thres** (Threshold): Sets the input signal level in dB above which the gate will open. This is the turn-on (upper) threshold, shown in the display as a yellow point. The turn-off (lower) threshold is adjusted in tandem with the turn-on threshold, with an offset determined by the Hyst (hysteresis) control.

**Hyst** (Hysteresis): Adjusts the difference between the turn-on (upper) and turn-off (lower) thresholds. The turn-off threshold appears as a red point in the display. It can be set up to 10 dB below the turn-on threshold.

**Floor**: Sets the level to which gate gain drops when the gate closes. The gate can thus be set so that it does not close completely.

**Gain** adjusts the output signal level.



# Flangers

The Pulsar Flangers permit the use of extreme settings. The **Mono Flanger** is an insert effect, while the **Stereo Flanger** and **Cross Flanger** are aux effects.

Operationally, there are only minor differences between the various flangers. The controls include:

**Delay:** Sets the internal delay which produces the basic effect. (The effect itself is not delayed.) Lower delay values have the greatest effect upon low frequencies. With longer delays, high frequencies are more strongly affected.

**Rate:** Controls the rate of delay modulation.

**Depth:** Controls the amount of delay modulation.

**FB** (Feedback): Controls the amount of effect (i.e., delayed) signal which is fed back to the flanger input. For the **Stereo Flanger**, which has separate left and right delays, feedback is from the left delay output to the left input and from the right delay output to the right input – the Stereo Flanger is essentially two separate flangers in one. The **Cross Flanger** is basically a Stereo Flanger which uses cross-coupled feedback connections.

**L/R Phase:** An additional control on the Stereo and Cross flangers which allows adjustment of the phase difference between the delay modulation of the left side and that of the right side.



# Delays

Pulsar offers three Delay effects. The **Mono Delay** is an insert effect. The **Stereo Delay** and **Cross Delay** are stereo aux effects, with most controls affecting both left and right delay lines in common.

Operationally, there are no differences between the various delay effects. The controls include:

**Time:** Sets the delay time in milliseconds. The Stereo and Cross Delays offer separate left and right delay time controls.

**FB** (Feedback): Controls the amount of effect (i.e., delayed) signal which is fed back to the delay input, and thus, the rate at which the loudness of the echoes diminishes. For the **Stereo Delay**, which has separate left and right delays, feedback is from the left delay output to the left input and from the right delay output to the right input – the Stereo Delay is essentially two separate delay lines in one. The **Cross Delay** is basically a Stereo Delay which uses cross-coupled feedback connections.

**HDamp** (High-frequency Damping): attenuates high frequencies in the feedback paths, causing echoes to become progressively "softer".





# Chorus

Pulsar offers a **Stereo Chorus** as an aux effect. In essence, it is a Stereo Flanger with modified algorithms and longer delay times. The controls include:

**Delay:** Sets the internal delay which produces the basic effect. (The effect itself is not delayed.) Lower delay values have the greatest effect upon low frequencies. With longer delays, high frequencies are more strongly affected.

**Rate:** Controls the rate of delay modulation.

**Depth:** Controls the amount of delay modulation.

**FB (Feedback):** Controls the amount of effect (i.e., delayed) signal which is fed back to the chorus input.

**L/R Phase:** Allows adjustment of the phase difference between the delay modulation of the left side and that of the right side.



# Phasers

The Pulsar Phasers are functionally similar to the flangers. The **Mono Phaser** is an insert effect, while the **Stereo Phaser** and **Cross Phaser** are aux effects.

Operationally, there are only minor differences between the various phasers. The controls include:

**Rate:** Controls the rate of effect modulation.

**Offset:** Sets the internal delay which produces the basic effect. (The effect itself is not delayed.) Lower offset values have the greatest effect upon low frequencies. With higher settings, high frequencies are more strongly affected.

**Depth:** Controls the amount of effect modulation.

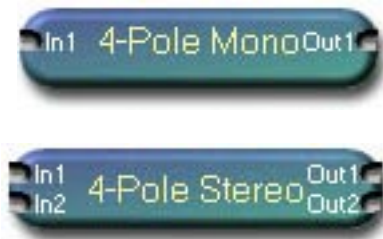
**L/R Phase:** An additional control on the Stereo and Cross phasers which allows adjustment of the phase difference between the effect modulation of the left side and that of the right side.

**FB (Feedback):** Controls the amount of effect output signal which is fed back to the phaser input. For the **Stereo Phaser**, which has separate left and right sections, feedback is from the left effect output to the left input and from the right effect output to the right input – the Stereo Phaser is essentially two separate phasers in one. The **Cross Phaser** is basically a Stereo Phaser which uses cross-coupled feedback connections.



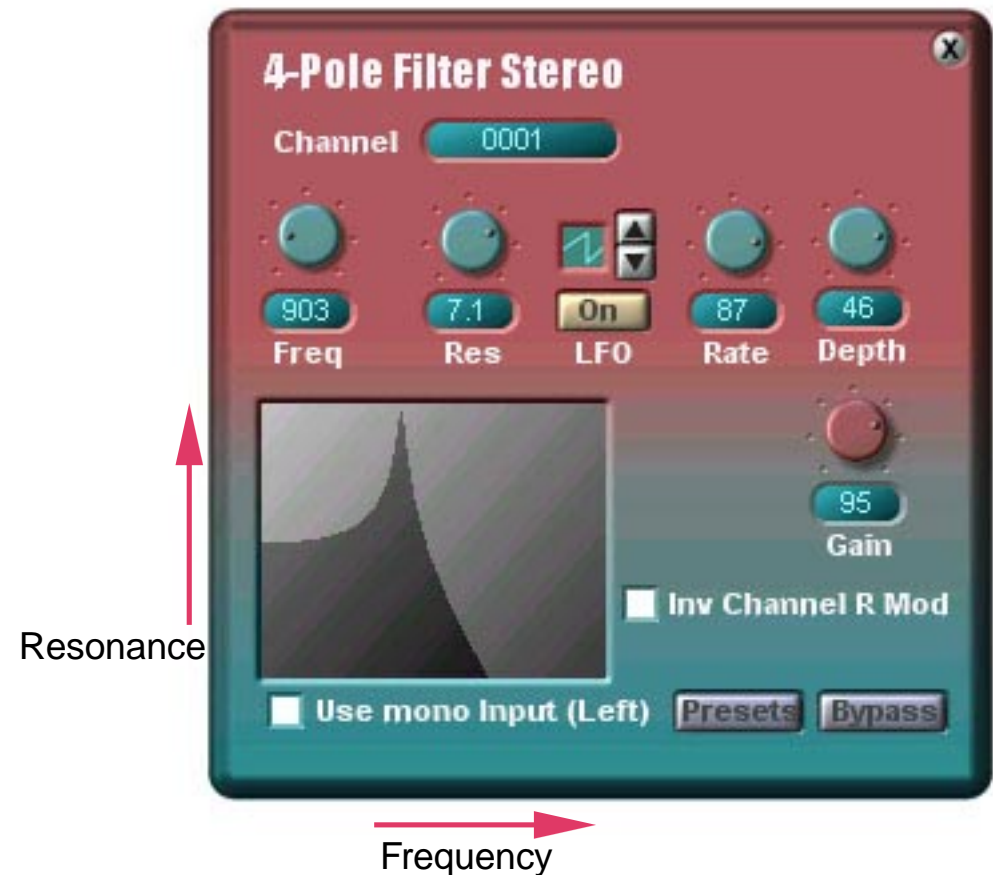
# 4-Pole Filters

There are two versions of the **4-Pole Filter**: a mono-insert version and a stereo-insert version. Both are adjustable Q low-pass filters with identical functionality.



The filter can be quickly and intuitively edited via the graphical display as indicated at right. Use the left mouse button with horizontal movements to adjust the low-pass cutoff frequency (**Freq**) and the right mouse button with vertical movements to adjust the resonance (**Res**). You can also adjust the filter via the Freq and Res controls, which additionally allow you to make finer adjustments.

An **LFO** is available for modulation of the cutoff frequency. It has **Rate** and **Depth** controls and can be switched in or out via the **LFO** switch. The **LFO waveform** can be selected via the arrow buttons or directly in the waveform display field next to the buttons.



# Parametric EQ

The Parametric EQ is an insert effect. It is functionally identical to the EQ found in each channel of the Big Mixer.

The Parametric EQ permits up to four full-parametric filters (filter bands) at one time. These are represented by small red points in the EQ graphic window. New filters can be added (up to the limit of four) by double-clicking in this window.

The **center frequency (Freq)** of each filter can be changed by clicking and dragging with the left mouse button on the corresponding point in the graph and moving it sideways. By moving it up or down, you change the filter **gain**. Upward or downward dragging with a *right-button* mouse click adjusts the filter **Q**.

The same adjustments can be made via the corresponding knobs or via direct entry of numerical values in the associated number fields. The **Freq 1-4** buttons offer an alternative means of selecting individual bands.

The **zoom bar** can be made smaller by clicking and dragging on its ends, thus zooming the graphical display in for a closer view. You can then move the zoom bar by clicking and dragging on its middle to zero in on the desired display range. Double-clicking on the zoom bar



toggles between the magnified and full-range views. With **Auto Range** enabled, the display range is selected automatically.

The **bypass** button defeats the EQ. This also takes the EQ out of the DSP circuit, reducing DSP loading accordingly. (Likewise, each deletion of an unused filter band reduces the DSP load slightly.)

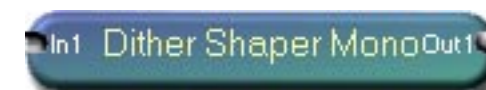
# Dither / Shaper

The Dither/Shaper modules are especially intended for use during mastering, to minimize the undesirable effects of quantization errors which can arise in the course of this process.

These modules should always be used directly before the audio outputs (generally ASIO, Wave or other audio drivers), with no intervening level adjustments.

Pulsar processes audio signals internally with a resolution of 32 bits. However, when the final output signal leaves Pulsar – for example, when a mixdown in Pulsar is routed to an audio sequencer program via 24-bit or 16-bit audio drivers, so that it can be recorded to disk (and later to CD) – the audio resolution is unavoidably reduced. At times when the audio signal level is down near the lower end of the theoretical dynamic range of this reduced-resolution format – i.e., when there are "just a couple of bits" being used, as at the end of a track or in very soft passages – the effects of quantization can become noticeable as an objectionable form of audio distortion.

The Ditherers process the signal so that a uniform noise component appears in place of this distortion. While this noise can also become audible in the quietest passages, it is generally found to be less objectionable to the listener than the quantization distortion.



Mono effect



Stereo effect

The Shapers modify the energy distribution of the noise, shifting it toward the high- and/or low-frequency ends of the audio spectrum where the human ear is less sensitive, without reducing the effectiveness of the dithering.

The default settings of the Dither/Shaper modules are well-suited for the transition from 32-bit to 16-bit format. However, you can experiment with the use of various Dither options, alone or in combination with the various Shaper options.



# MIDI Remote

The **MIDI Remote** devices make it easy to **integrate your external effects devices** into the Pulsar environment. The two available devices differ only in the type of control element they use, i.e. faders or knobs.

## Assigning MIDI controllers

Begin by setting the MIDI Remote to the same MIDI channel your effects device is set to. The first two controls are reserved for sending MIDI Bank Select and Program Change messages. You can freely assign MIDI controller messages to the other controls via the Controller Settings control panel. Simply open this control panel and click on a MIDI Remote fader or knob to select it, then double-click on any controller number in the Controller Settings list to assign it to the selected control. Corresponding MIDI Control Change messages are now sent out by the MIDI Remote when you move the associated control. Double-click again on an already-assigned controller number to delete the assignment to that number.

Now connect the MIDI output of the MIDI Remote to the Pulsar MIDI Dest module and connect your external effects device to the Pulsar MIDI Out jack. The effects device can now be controlled via MIDI from within Pulsar.





If the initial set of eight controls is not enough for your purposes, you can "grow" more. Open the **Grid** drawer and increase the **Cols** (Columns) setting to add controls one at a time (per row) or the **Rows** setting to add a whole new row of controls to the MIDI Remote.

The labels above each control (initially "Untit.") can be edited, so that each control can have a distinct name. (These names also appear in the Controller List when you make assignments to the controls.) To edit a control's label, click on the existing label and type in a new one, followed by <Enter>.

### Audio connections

Connect your external effects device to inputs and outputs on the Pulsar card – for example, the analog inputs and outputs. Now open the **Connections** drawer. At left is a list of the effect device inputs and outputs. Select each of these in turn, and for each one, select in the list at right the Pulsar input or output to which it is connected.

