



Precision Stereo Imager

Version 1.0
Copyright Big Melon Audio, 2011

Description

PSIonic is a dual band stereo imaging VST plugin for precise and artifact-free stereo field control. The hybrid panning algorithm allows a smooth transition from stereo rotation to fully mono compatible stereo pan, with full user control of pan law, and how much the stereo field is crushed (narrowed) as the pan moves away from center.

It is ideal for natural sounding pan sweeps that sound full even when panned hard over, yet retain a high degree of mono compatibility. Also perfect for panning samples: the built in crossover allows you to separate bass instruments from vocals and instruments with a higher range.

Other features:

- input dual left+right pan and gain section
- dual band gain and stereo width control
- built in goniometer (vector phase scope)
- selectable left/right or mid/side input and output. It can function as a mid/side encoder or decoder.

System Requirements

For the x64 Windows version:

- x64 version of XP SP2+, Vista SP1+, or Windows 7
- Microsoft Visual C++ 2010 Redistributable Package (included with the installer)
- and a 64 bit VST host

For the x86 Windows version:

- x86 or x64 bit version of XP SP2+, Vista SP1+, or Windows 7
- Microsoft Visual C++ 2010 Redistributable Package (included with the installer)
- and a 32 bit VST host

Mac OSX – coming soon!

Installation

Consult the table below to determine the version you should install.

	x86 Windows	x64 Windows
32 bit DAW/host	x86 version	x86 version
64 bit DAW/host	N/A	x64 version

It is safe to install both the x86 and x64 packages on an x64 Windows system. On an x86 Windows system you may only install the x86 package.

Each installation package supports both VST3 and VST2 plugin installations. You may safely install both. For each type, the installer automatically determines the system-wide plugin directories, but you have the option to change it.

The installer also installs the required Microsoft Visual C++ v.10 runtime libraries if it is not already installed on the target machine.

Features

Built-in Mid/Side Encoder and Decoder

Plugin input and output are selectable for Mid/Side or Left/Right operation. Encoding and decoding operations remain active in bypass mode (in hosts that support bypass processing).

Input Section

input dual gain and pan; balance control

- tweak unbalanced stereo recordings where gain on one mic is higher than the other
- mix left and right channels

asymmetric balance control

- bring out the left or right side of the stereo field, without changing the middle

Crossover Section

- selectable Linkwitz-Riley crossovers LR-2 @ 12dB/Octave OR LR-4 @ 24dB/Octave
- frequency adjustable
- may be disabled for CPU efficient operation

For Each Band

gain and stereo width control

- adjust the volume
- control the width of the stereo field

stereo panning

- hybrid pan algorithm
- adjustable pan law (not fixed settings)
- adjust the pan so that it sounds equal volume across the stereo field
- OR adjust for your desired level of mono compatibility
- adjustable level of stereo crush
- do hard pans without mono-izing your stereo signal like a typical stereo pan
- the pan amount is precisely specified by degrees of rotation

Overall

- smooth parameter adjustment and automation
- zipper-free
- sample accurate (VST3)
- built in goniometer (vector scope)
- CPU efficient

Technical Features

- VST3 and VST2.4 compatible.
- 64 bit double precision floating point math.
- Sample accurate automation (VST3).
- CPU efficient:
- SSE and SSE2 optimised calculations (depending on the CPU).
- Zero latency (PDC).
- Any sampling rate.

Usage

PSIonic addresses the drawbacks of usual stereo field controls:

- **Stereo Balance Control.** A balance control is not a true stereo panner: the harder you pan with it, the more you lose an input channel. For example, on a hard left pan, the input right signal will be inaudible. A true stereo panner, like PSIonic, will retain both input channels at any pan position.
- **Stereo Rotation:** A stereo rotation can rotate too much energy into the side channel and compromise mono compatibility. PSIonic controls how much width compression (crush) is applied (proportionately to the pan).
- **Insufficient control over pan law.** Other panners give you a discrete choice between equal

power (3dB), equal mono volume (6dB), or an in-between value (4.5dB). PSIonic allows you to choose any pan law between 3 and 6 dB, so it sounds best for your environment.

- **Most DAWs make crossover routing a pain, if they can do it at all.** PSIonic's built in crossover makes dual band stereo field control easy.

Dual gain and pan section.

Use the dual gain to tweak the input signal. You can use this to correct an unbalanced stereo recording. You can also invert the left or right channel to correct for a miswired microphone. Use the dual panners along with the gain section to mix the left and right channels. This will pan the left and right channels independently, and is perfect to mix dual mono sources.

Balance Section

There are two balance controls, a conventional balance control which has the effect of panning the center, and an asymmetric balance control which allows the left or right side of the stereo field to be balanced, without affecting the center.

To control side levels, the Asymmetric Balance proportionately crushes the stereo width, adjustable with the Asymmetric Crush control. The Asymmetric Crush control can be turned down for narrow sources, but should be set higher for wider sources to reduce the side channel.

Crossover Section

Here you can select between LR-2 @ 12dB/Octave, LR-4 @ 24dB/Octave, or turn the crossover off. The crossover frequency is adjustable.

Stereo Width Section

Fine control over the stereo width. Turn it all the way down, and only the mid channel remains. Turn it all the way up, and only the side signal remains.

Stereo Pan Section

Pan Law sets the pan law for the Stereo Pan anywhere between 3dB (equal power) and 6dB (equal mono volume). A Pan Law setting between 4 and 5 usually sounds most flat across the stereo field. In order to control side levels, the Stereo Pan proportionately crushes the stereo width, adjustable with the Pan Crush control.

If full crush is used, a hard pan will cause only one speaker to output (will crush to mono). The opposite speaker will be completely silent (this is how other stereo panners work). The more you ease off the crush, the more signal will be sent to the opposite speaker, resulting in an audibly wider stereo field. Running with too low an amount of stereo crush can compromise mono compatibility, but it depends on the source material. It can be safely set low for narrow sources but may need to be set higher for wider sources.

Other Plugin Uses

- M/S encoding and decoding
- mono-ize bass frequencies

Programs

Default

A good compromise of mono compatibility and even sound across a pan sweep.

Bass Squeeze

Apply stereo narrowing to the bass frequencies. Adjust the crossover frequency and low pass width to the desired level.

Top and Bottom Pan

Separate bass instruments from vocals and higher range instruments. Default crossover frequency of 300 Hz. Adjust top and bottom pan independently.

Mono Compatible Pan

In mono, it will not be perceptible that a signal is panned. In stereo, there will be a 3dB loudness increase at the pan extremes.

Stereo Rotation

Acts like the typical stereo field rotation. Use it to pan mono or stereo sources without regard to mono compatibility.

Stereosonic Shuffle

A similar technique as the legendary EMI REDD 'Stereosonic' consoles to focus the stereo image across the field. Ideal for XY stereo recordings and panned single microphones. This setting uses the crossover circuit to apply a 3dB attenuation of the side channel at frequencies above 700 Hz (see ref [1]). Because the crossover occurs earlier in the signal chain than the per band gain/width/pan control, you shouldn't make any further adjustment to the per band controls as it will degrade the effect. If you want to pan, do it with a separate instance of PSIonic earlier in the signal chain, keeping its crossover disabled.

If you do use a shuffler, keep in mind that you may be working at cross purposes if you are also processing the signal with other frequency dependent stereo width adjustment.

What it Can't Do

PSIonic cannot turn mono material into stereo. The techniques for doing that require adding delay or comb filtering the input signal, which often causes audible processing artifacts. PSIonic is carefully engineered to be free of delay and phasing artifacts, and stereoizing a mono signal is best left to a separate plugin.

Reference

[1] H.A.M. Clark, G.F. Dutton, P.B. Vanderlyn, *The 'Stereosonic' Recording and Reproducing System* Journal of The Audio Engineering Society, vol. 6, no. 2, April 1958

Credits

A big thank you to g200kg <http://www.g200kg.com> for knobman and skinman, and to the active community of artists and developers on KVR for inspiration.

Knobs are copyright az <http://bji.yukihotaru.com/knob.html>. (Licensed CC BY 3.0)



VST is a trademark and software of Steinberg Media Technologies GmbH

License

This software is copyright Big Melon Audio. You may not sell, rent, or distribute this software without the consent of Big Melon Audio.

This software is distributed as shareware. In installing and/or using this software, you agree to the following terms.

- 1) This software may be used without charge for 30 days, subject to these terms. Usage after the trial period is unauthorized unless a usage license has been purchased.
- 2) You may not use this software in a commercial context without a commercial usage license.
- 3) You have the full 30 day trial period to determine whether this software suits your purposes. In purchasing a usage license, you agree that the software meets your requirements "as is."
- 4) Big Melon Audio disclaims all warranties with respect to this software. You agree to exempt Big Melon Audio from damages or other liability arising from its use.
- 5) You agree not to reverse engineer this software, including but not limited to decompiling or running it under a debugger. You may not modify it, or create derivative works based on it.

Notes

Mono Listening Environments

Maintaining mono compatibility is an important consideration if there is any chance that the mix might be played on a mono broadcast medium like AM radio or television. A stereo mix that sounds good in stereo, but is dominated by the side channel, will break down when summed to mono, so always remember to periodically check that your mix sounds okay under mono.

There is no ideal setup for both mono and stereo listening. At the 3dB pan law setting, the output power is equal across the pan, but a hard panned signal will sound quieter than a centered signal when summed to mono. At 6dB pan law, the panned signal won't change in mono, but in stereo it will sound louder when panned hard over. The best you can do is some kind of compromise.

Similarly, the stereo width doesn't need to be totally crushed on a hard pan, but the side channel energy does need to be controlled. The Pan Crush and Asymm Crush controls are provided to limit the signal that gets panned into the side channel, without crushing all the width out of the signal.

A good compromise is to choose a pan law between 4.0 and 5.0, and to keep Pan Crush and Asymm Crush at 50% (depending on the stereo width of the source). That will guarantee that widely panned elements in the source signal don't get panned too far to the side, and that pans sound reasonably flat in both stereo and mono.

Keep an eye on the signal on the built in goniometer, to see exactly how wide the stereo signal is under processing. And don't forget to listen to it in mono.

Reducing the Width of Low Frequencies (Bass Mono-izing)

Mastering techniques for popular music often include mono-izing the bass. This is crucial if you are cutting vinyl, as excessive energy along the axis normal to the disc (ie. the side channel) needs to be controlled so that the needle doesn't skip out of the groove.

It is still otherwise widely used. One rationale put forth is that because bass frequencies are hard to localize, it is best to move them to the middle. Another is that you don't want your (overworked) speaker drivers working against each other, especially in the low frequency range which carries so much energy. Or, perhaps to tighten up the low end to prevent a muddy sounding mix due to excessive reverb in the side channel...

Perhaps the most common reason for mono-izing the bass is due to the loudness wars. When you are pushing against the digital full scale, having both speakers carrying the same (maximal amplitude) signal will give you the maximum loudness.