Mach1 Spatial System™

Mach1 Panner
(M1-Panner)

Feature Guide

Table of Contents

Description & User Story

Mach1 Spatial Format Explained

Mach1 Spatial is a VVBP (Virtual Vector Based Panning) spatial audio format that encourages users to have complete freedom with their post production mixing process by not forcing the user to use any sonic signal altering processing. The user is free to apply their own DSP/ASP to their audio during the mixing process without needing to be forced into proprietary DSP algorithms for spatial audio seen in other formats or tools. With this in mind the user is completely in control of their creative mix process and can make any decision they want whether it results in realistic spatial fields or not.

Encoding Explained

The Mach1 Panner allows users to encode input audio tracks/channels in their preferred DAW (Digital Audio Workstation) to the Mach1 Spatial format. The process is a simple signal distribution process with no other DSP related effects, allowing complete 1:1 encoding into our Vector Based Panning format—Mach1 Spatial.

Plugin Features

The following explains all the current possible encoding modes of the Mach1 Panner in your common DAW/Editor.

General Parameters

Rotation

Rotates the input sound source(s) around central listener location.
Angles from 0 -> 180 -> -180 -> 0 going in a clockwise motion
[where 0 is front facing and 180/-180 is rear facing]

Diverge

Moves the input sound source(s) to and from center to allow control of divergence of signal, or otherwise allowing control of distribution of how the signal spreads around listener.
Values from 100 -> 0 -> -100 going from very front maximum divergence to rear inversion maximum divergence
[where 100 is front forward on current Rotation angle, 0 is center panning or mono divergence and -100 is the inverse of current Rotation angle]

X

Moves the input sound source(s) along the up/down axis in the top down view

Y

Moves the input sound source(s) along the left/right axis in the top down view

Z

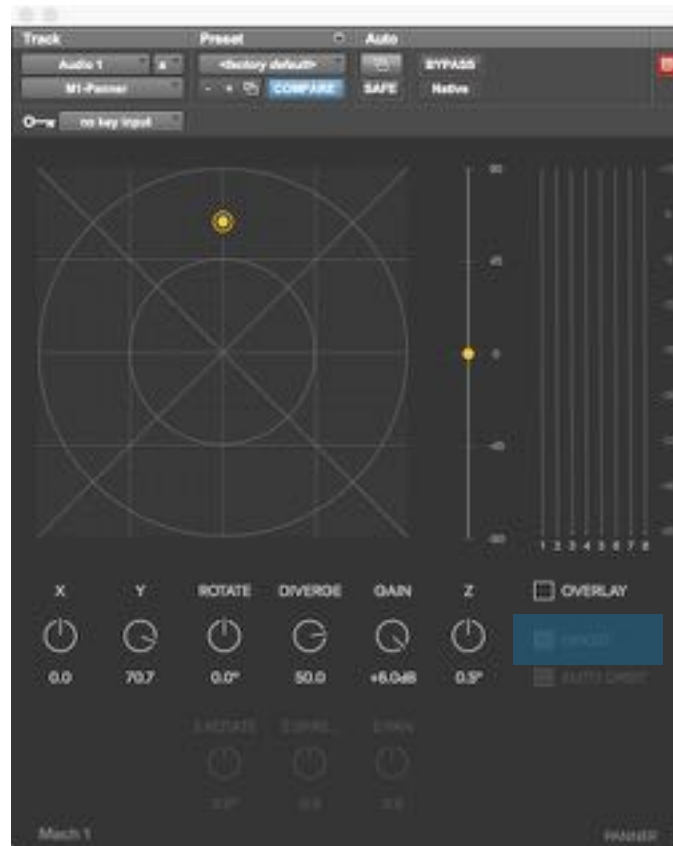Moves the input sound source(s) along the Z axis (up/down head pitch)

Gain

Controls input gain for input sound source(s) before encoding.

Overlay

Allows user to pan to picture by overlaying the reticle for a equirectangular 360 video.

Mono Parameters

M1-Panner mode for mono input channels/tracks of audio


Ghost

Creates a copy of the input sound source automatically panned inversely X,Y,Z for external processing in DAW. This allows users to easily take advantage of our divergence system by processing directionally isolated sound sources uniquely all while maintaining rotational relationship.

Available DAW: Reaper (VST/VST3/AU) [AAX support will be added as soon as Pro Tools HD supports Bus Delay Compensation]

Stereo Parameters

M1-Panner mode for stereo input channels/tracks of audio *(L & R)*
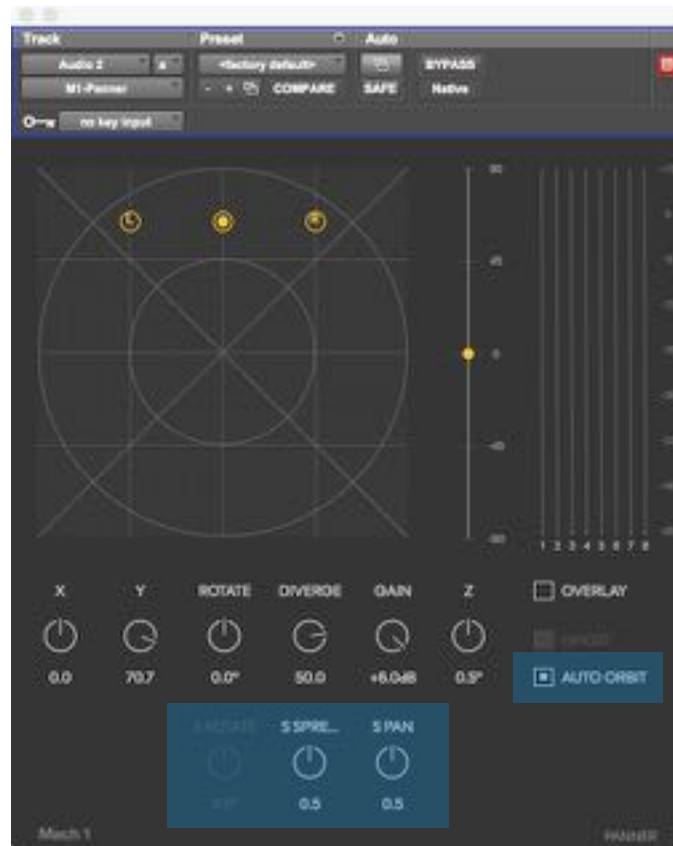
Stereo Spread
[S SPREAD]: Add/reduce the distance between Left & Right input reticles

Stereo Orbit Angle
[S ROTATE]: Rotates Left & Right reticles around center reticle axis for more creative control during mixing

Stereo Auto Orbit
[AUTO ORBIT]: When active Stereo Orbit Angle will automatically adjust to point toward center of M1-Panner grid

Stereo Balance

[S PAN]: Input balance/pan between Left & Right input channels

Quad Parameters

M1-Panner mode for Quad input channels/tracks of audio *(L, R, Ls, Rs)*

Quad - AFormat Ambisonics

M1-Panner mode for stereo input channels/tracks of audio *(FLU, FRD, BLU, BRD)*

Quad - BFormat Ambisonics

M1-Panner mode for stereo input channels/tracks of audio *(W, X, Y, Z ACNSN3D)*

Quad General Parameters

Quad Mode Dropdown
Allows the user to change/select their 4 channel Quad mode for their audio track.

BFormat & AFormat Parameters

AFormat
Intended for A-Format ambisonic microphone arrangements setup in the
1: front-left-up [FLU]
2: front-right-down [FRD]
3: back-left-down [BLD]
4: back-right-up [BRU]

BFormat
Intended for ACNSN3D AmbiX B-Format 4 channel audio tracks, to encode them by reversing each pole's channel into 2 channels with one phase inverted and oriented inversely to maximize the pre-AmbiX encoded audio.

Notes

- **Divergence Consistency:** Rotation automation in the M1-Panner is currently using a radiance focused UI system due to the ease of use for users. This sacrifices the ability to have a perfectly consistent divergence ratio of signal front/back as you rotate your source. In an upcoming update we will add a processing mode that users can select to focus on Divergence Consistency.

- **Pro Tools HD Automation**: It is observed that Pro Tools HD by default always interpolates automation to smooth all values to only two floating points (example: 20.04 instead of 20.03997); because of this continuous performance knobs/sliders, specifically the Rotation parameter are prone to a GUI bug if you record Automation for this parameter in full rotations and play it back from the Host (Pro Tools HD). This issue can occur when recording automation that travels past 180 crossing, this is due to the value attempting to reset to -180 (or 180 if counter-clockwise).

(Pro Tools HD Automation cont.)

Simply un-ramp the automation to further cleanup playback of a fully rotating source. Example shown below:
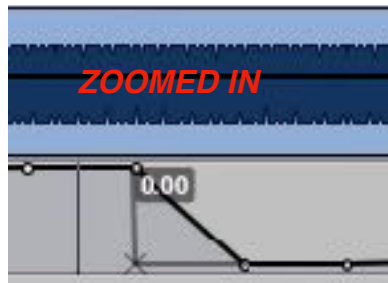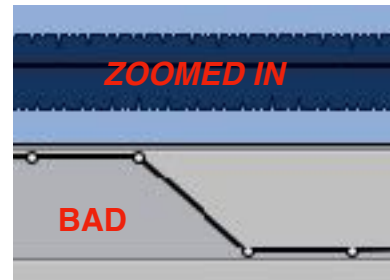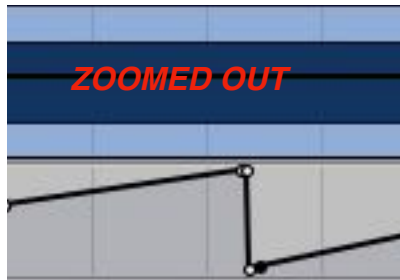
Upcoming Features

- **StereoSafe Mode**: Activated via M1-Monitor, when this mode is enabled all Panner's process audio with Mono output so that the user can quickly export a stereo version that is spatially safe in all directions for 360 video players that do not support spatial audio yet. The Diverge values during the mix are instead used to correct the gain ratio between all spatial components so that the mix is retained without the user needing to remix the full mix.
- **Dynamic Panning Normalization**: Adds better normalization for preserving audio power no matter where panning/encoding audio input source(s).
- **Dynamic Divergence Normalization**: Changes the processing to retain 100% consistent divergence ratio between front/rear while rotating a sound source.
- **Display Monitor Orientation on Panner Grid**: Display current M1-Monitor's orientation of Yaw on each instance of M1-Panner.
- **Overlay Displays Stereo & Quad Reticles**: Displays extra reticles seen in Stereo and all Quad modes on Overlay for reference.