



WideEngine

User Manual

Product Version	1.6.2
Platform	Windows x64
Format	VST3

Professional guide to installation, configuration, and safe operation

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1. Product Overview

PhotonDSP WideEngine is a multiband spatial processor for creating, widening, and correcting the stereo image.

Instead of a single broadband Width control, the plug-in divides the signal into five frequency regions. For each region, you can independently:

- move all band content between L and R independently of the effects and their Mix;
- choose whether the effects process the entire band signal or only its Side component;
- add micro-detuning;
- add a Haas delay;
- adjust the amount of Detune and Haas in the band;
- temporarily enable Solo for precise monitoring.

The separate Advanced Spatial section adds harmonic, time, and phase differences.

The output section lets you compare the result with the original, monitor Mid or Side, adjust the overall Pan, and compensate for level changes using Gain (recommended) or Auto Gain.

WideEngine is designed for both existing stereo material and pseudo-stereo: identical L/R channels are acceptable. To create stereo from a single-channel source, the track in the DAW must still have stereo input and output routing.

2. Installation and First Launch

VST3 Installation

The standard plug-in location in Windows is:

```
C:\Program Files\Common Files\VST3\PhotonDSP\PhotonDSP WideEngine.vst3
```

After installation, refresh the plug-in list in your DAW. WideEngine appears among the spatial effects from PhotonDSP.

Important: Use a Stereo Track

For full operation, the host must provide WideEngine with two output channels.

If the plug-in reports that the track is single-channel mono:

1. switch the DAW channel to stereo; or

2. move the audio to a new stereo track; or
3. create pseudo-stereo in which L and R contain the same source signal.

Identical L and R signals are not a problem. WideEngine can create stereo differences from such a source. The problem arises only when the DAW routing provides the plug-in with a single output channel: there is no second channel through which the generated Side component can be output as a complete L/R pair.

Interface

The window size is fixed. Interface scaling and aspect-ratio changes are not supported.

3. Quick Start

Quick approach:

- Work on the loudest and densest section.
- Keep the first band locked and use Solo to select the required bands.
- Choose A or S and add only the required Detune, Haas, and/or Advanced Spatial processing.
- Unlock the band Mix controls only when necessary and blend in the effect moderately.
- Global Pan is usually unnecessary; use it for creative positioning or to correct an existing imbalance.
- Check M/S, correlation, and the mono sum.
- Compare using Bypass and match the level with the recommended Gain control. Auto Gain is an additional option.

Stereo widening does not require all modules to be used simultaneously.

4. Signal Flow

Simplified processing sequence:

```
Input L/R → 5 Bands → Global Pan → Target → Detune → Haas → Band Mix → Advanced Spatial  
→ Output Mix → M/S Monitoring → Output Pan → Auto Gain → Gain → Bypass →  
Analyzers/Output
```

Important Concepts

- Global Pan operates before Detune and Haas, so the effects receive the band after it has already been moved.
- Target A/S in each band applies to Detune and Haas, but not to Global Pan.
- the band Mix applies only to the Detune and Haas result for that band;
- the band Mix does not attenuate Global Pan or control Advanced Spatial;
- Output Mix in the output section controls the overall difference created by the plug-in: band Pan, Detune/Haas, and Advanced Spatial;
- Output Pan moves the complete processed signal;
- the analyzers and meter receive the final signal sent from the plug-in output.

When band processing is not in use, WideEngine preserves the direct source path. When band processing is enabled, the plug-in smoothly transitions to the phase-matched multiband path to reduce clicks and abrupt tonal changes.

5. Main Controls

Frequency Bands and Spectrogram

WideEngine uses five processing regions:

Band	Frequency Range	Typical Content
1	up to 160 Hz	sub, bass, foundation
2	160–750 Hz	density, low-mid, body
3	750 Hz–3 kHz	midrange, speech, primary intelligibility
4	3–9 kHz	attack, clarity, presence
5	above 9 kHz	air, high end, noise details

The split uses steep, phase-matched filters. The bands occupy equal visual widths in the spectrogram, but frequency is distributed non-linearly within each region. Therefore, the horizontal axis is not a conventional uniform scale.

Mid/Side Spectrogram

- the blue trace represents Mid, meaning the shared content of L and R;
- the pink trace represents Side, meaning the difference between L and R;
- the vertical scale is non-linear and marks 0, –12, –48, and –96 dB;
- the trace rises quickly and decays smoothly, making low-level Side easier to see;
- the display is musically smoothed and intended for evaluating shape and balance, not for laboratory measurement of individual FFT bins.

A strong pink trace does not necessarily indicate a problem. Evaluate it together with Mid, the phase indicator, and mono monitoring.

Band Solo

The S buttons above the spectrogram temporarily leave only the selected bands audible.

- multiple bands can be selected simultaneously;
- the selected ranges are displayed on the spectrogram with soft edges;
- attempting to enable all five Solo buttons resets the mode because this is equivalent to the full signal;
- Solo is not stored in presets;
- Solo remains active during internal Bypass: the user hears the clean version of the selected bands.

The Solo filters are steep but are not brick-wall filters. Small tails around the boundaries are natural for real audio filters.

Global Pan

The five Global Pan controls move the complete content of each band between L and R. Everything within the band is processed: both Mid and any existing Side.

This is not a simple Balance control. WideEngine not only reduces the opposite channel but also transfers its contribution to the target channel. Therefore, Pan works with both conventional stereo and pseudo-stereo, where L and R are initially identical.

Labels:

- **C** — center;
- numbers on the left/right indicate the amount of movement;
- **FL / FR** — the extreme control positions.

Internally, safe level compensation reduces the risk of sudden peak increases when correlated signal content is transferred. As a result, Pan may feel different from a conventional constant-power pan in a DAW mixer.

The lower bands are protected more conservatively than the upper bands: their actual movement is limited by internal bass protection even when the control indicates a large value. This helps preserve the foundation and the center.

Important

- the band Mix does not affect Global Pan;
- Target A/S does not limit Global Pan;
- the overall Output Mix reduces the contribution of Global Pan together with the rest of the processing;
- the overall Output Pan moves the complete result, not an individual band.

Band Target, Detune, Haas, and Mix

Target: A / S

Target determines which component of the band is sent to Detune and Haas.

- A – All: the complete stereo content of the band is processed;
- S – Side: only the difference between L and R is processed, while Mid remains as the anchor.

Side is generally safer for an already established center, but it requires an existing Side component. With strictly identical L/R signals, Side is zero, so the effect may be almost inaudible in S mode. To create the initial stereo difference, use A and/or Advanced Spatial; use Global Pan only when necessary.

Detune

Detune creates a small pitch shift in the selected channel within the band. The value is specified in cents and changes in whole-number steps.

The L/R buttons select the side on which the shifted version is created.

Internally, a micro-pitch process uses a smooth windowed crossfade and interpolated delay. A zero value restores the clean path, and parameter changes are smoothed.

Haas

Haas delays the selected side of the band by a short amount of time. The value is specified in milliseconds and changes in whole-number steps.

The L/R buttons select the delayed channel. When the time is changed, the old and new delay positions crossfade smoothly to reduce clicks and pitch sweeps.

Haas is inherently linked to phase changes and comb filtering. These changes cannot be fully compensated without eliminating the effect itself.

Mix for Each Band

The band Mix controls the combined Detune and Haas result relative to the clean band after panning.

- 0% – Detune and Haas make no contribution;
- 100% – the full calculated Detune/Haas result;
- intermediate values blend in only the difference created by these two effects.

Detune/Haas values begin working from the first step and quickly become audible. This is intentional: precise blending is performed with the separate Mix control.

When Detune and Haas are set to zero, the band Mix position does not change the sound.

Locks

Band 1 Lock

- Clicking the lock icon toggles its state: red means enabled, and green means disabled. The first-band lock is enabled by default. It locks:
 - Global Pan for the first band;
 - Target;

- Detune and its L/R selection;
- Haas and its L/R selection;
- the Mix for the first band.

Solo for the first band remains available.

The lock blocks only the controls. If the first-band settings have already been changed, enabling the lock does not reset them or change the sound.

Mix Lock

A separate lock disables all five band Mix controls. It is also enabled by default to prevent accidental changes to the level of the time- and pitch-based effects.

Band 1 Lock and Mix Lock operate independently. If Mix Lock is disabled while Band 1 Lock remains enabled, the Mix for the first band is still locked.

Both locks are stored in presets.

6. Advanced Processing

Advanced Spatial

Advanced Spatial operates after the multiband Pan, Detune, and Haas processing. It is a unified section of high-frequency spatial effects.

Target: All / Side

- **All:** the effects receive the complete stereo signal;
- **Side:** the effects receive only Side, while Mid remains as the anchor.

In Side mode, a strictly identical L/R signal should not create noticeable widening by itself: a Side component must already exist.

High-Pass Filter

The filter passes frequencies above the selected point and restricts the low end in the Advanced Spatial wet path.

It does not cut the main dry signal. Filtering is applied before the spatial effects and again to the wet difference they create. This double protection is necessary because delay, comb, and phase processes can generate a low-frequency Side tail even after the initial filtering.

The higher the cutoff, the lower the risk of smearing the bass and low-mid range. Start with a high setting and lower the filter only when necessary.

Harmonics

Harmonics creates different harmonic coloration in the two channels:

- one side uses more symmetrical tape-style saturation;
- the other uses more asymmetrical tube-style saturation;
- the harmonic difference adds width, density, and air.

Only the wet branch above the High-Pass Filter is processed. Internal safeguards provide DC protection, control excessively harsh sibilance, and limit excessive high-frequency excitation.

Risk: on bright vocals, cymbals, and sibilant sounds, high values may emphasize hiss or shift the perceived balance toward one channel.

Comb Filtering

Comb Filtering uses several short delayed copies and adds them complementarily, with opposite polarity in L and R. This creates distributed peaks and notches that are perceived as width and spatial coloration.

The added comb component is designed to cancel more effectively when summed to mono, but the final result still depends on the source material and other active modules.

Risk: high values may produce a hollow, metallic, or phase-heavy character. On drums, attack density may be reduced.

Micro Reflections

Micro Reflections creates a short set of early reflections with different timings for L and R. It is not a full reverb: there is no long tail or feedback.

The effect adds a sense of air, an early room, and separation of the source from the center. Internal damping reduces metallic high frequencies, while transient protection attenuates reflections on sharp attacks.

Risk: excessive Reflections can blur consonants, drum transients, and vocal intimacy.

Phase

Phase uses different multistage all-pass networks for L and R. The amplitude of individual frequencies changes only slightly, but their phase and timing diverge, creating a wider texture.

Internally, excessive Side addition is limited and transients are protected.

Risk: high values may weaken the center, reduce mono compatibility, or make the sound hollow. Always check the phase indicator and the mono sum.

Upper Control Range

For all four effects, the upper part of the control range intentionally becomes more aggressive. This is a sound-design region rather than a conventional correction range. Enter it deliberately and compare results at matched loudness.

7. Analysis, Monitoring, and Output

Monitoring and Output

Bypass

Internal Bypass smoothly restores the clean signal without disabling the plug-in instance itself.

- when Solo is active, Bypass preserves the selected bands but removes their processing;
- the spectrogram and stereogram display the signal after Bypass;
- the output meter also measures the actual bypassed signal.

For a final transparency check, also use the DAW's own bypass. Internal Bypass is convenient for musical comparison within the current Solo/Monitoring mode, while host bypass completely removes the instance from the host's processing.

M / S / MS

Only one mode is active at a time:

- M – Mid only, identical in L and R;
- S – Side only, with opposite polarity in L/R;
- MS – the conventional complete stereo signal.

S mode is useful for detecting excessive bass, hiss, smeared transients, and an overly prominent delayed copy. Side monitoring sounds unusual by itself and is not intended for judging the tonal balance of the complete mix.

Output Mix

Output Mix controls the overall amount of change introduced by WideEngine.

- 0% – the phase-matched clean base;
- 100% – the full result;
- intermediate values reduce the combined difference created by Pan, Detune/Haas, and Advanced Spatial.

This is not a conventional blend of raw dry and phase-altered wet signals. The plug-in uses a phase-matched clean base to reduce level dips and comb coloration at intermediate positions.

Output Mix does not replace the DAW's Bypass: when multiband processing is active, the clean base remains part of the internal phase-matched architecture.

Output Pan

Output Pan moves the complete processed signal between L and R rather than merely attenuating the opposite channel. Because the widening is psychoacoustic, it can correct a perceived channel imbalance even when the measured levels are equal.

Gain

Gain is the recommended method for manually correcting the output level. The value is displayed in dB to one decimal place.

Auto Gain

Auto Gain attempts to compensate for changes in loudness but does not prevent peak overs. It is not recommended for the final render.

Compare dry and wet at similar loudness levels.

Stereogram, Phase, and Output Meter

Stereogram

The hemisphere shows the instantaneous distribution of Mid and Side:

- a narrow vertical pattern near the center indicates high correlation and a narrow stereo image;
- a wider cloud indicates greater differences between the channels;
- a strong lean to one side indicates a possible L/R imbalance;
- the points have a trail and adaptive sensitivity, so the shape is more important than the absolute size.

Phase / Correlation

The vertical indicator on the right shows channel correlation:

- closer to +1 — the channels are strongly correlated, and mono compatibility is generally safer;
- around 0 — a wide or decorrelated field;
- below 0 — the out-of-phase component and the risk of loss when summed to mono increase.

Brief transitions to zero or below may be musically acceptable. Persistent negative correlation, especially at low frequencies, requires checking.

L/R Meter

The two vertical bars measure the final L and R outputs after Monitoring, Pan, Auto Gain, Gain, and internal Bypass.

- the lower value shows the current level in dBFS;
- the red upper zone indicates that the threshold has been exceeded;
- the number in the red zone shows the highest recorded peak;
- clicking the meter resets the held peak;
- the meter decay is intentionally smooth to make the level easier to read.

Readings in WideEngine and the DAW may differ slightly because of different ballistics, RMS windows, peak-hold behavior, and measurement points. Significant persistent differences require checking the routing, any fader after the plug-in, and the meter's post-/pre-fader mode in the DAW.

8. Presets

Selection

- clicking the name in the header opens the list;
- the left and right arrows move to the previous or next preset;
- user presets appear above factory presets;

- the currently selected preset is highlighted;
- clicking outside the list closes the window.

CLEAN IN/OUT is the required factory preset containing the default settings. The RESET button loads this preset.

Modified State

After a stored setting is changed, an * is added to the name. This indicates that the current state differs from the loaded preset. The original preset file is not overwritten automatically.

Saving

1. Click the disk-shaped Save icon in the header.
2. Enter a name of up to 20 characters.
3. Click Save.

An empty name is not accepted. The new preset is created as a user preset.

Renaming and Deleting

- When you hover over a user preset, a cross for deletion and a pencil for renaming appear.
- factory presets cannot be renamed or deleted;
- Delete requires confirmation;
- Rename changes only the name, not the stored parameters.

Stored Parameters

A preset includes:

- Pan, Target, Detune, Haas, and Mix for all bands;
- Advanced Spatial parameters;
- Bypass, M/S/MS, Output Mix, Output Pan, Gain, and Auto Gain;
- Band 1 Lock and Mix Lock.

Solo is not stored because it is a temporary monitoring mode.

User presets are stored in:

```
%APPDATA%\PhotonDSP\WideEngine\Presets\WideEnginePresets.txt
```

Do not edit the file while the DAW is running: changes may be overwritten by the current plug-in instance.

9. Trial and Activation

Free Trial

The trial period lasts 14 days.

1. Click Start Free Trial.
2. WideEngine opens a secure PhotonDSP page in your browser.
3. Enter your email address and complete the verification.
4. Open the email from PhotonDSP and confirm the trial activation.
5. Return to the plug-in and wait for confirmation.
6. Click Start Using.

The trial requires periodic internet access. A brief network interruption does not immediately stop an already authorized session. If verification remains unavailable for too long, processing is paused and the plug-in safely returns to the original dry signal.

The offline window provides:

- Refresh – retry verification;

- Buy – open the PhotonDSP website;
- Activate – proceed to paid serial-code entry.

Paid Activation

1. Paste the serial code into the activation field.
2. Click ACTIVATE.
3. After the Successfully activated message appears, click Start Using.

Internet access is required for the initial activation. After successful local activation, the paid version works offline. One serial supports up to three active installations.

The serial can be pasted with Ctrl+V. The field accepts Latin letters, numbers, and hyphens, and automatically converts letters to uppercase.

10. Practical Setup

General Approach

WideEngine is a psychoacoustic processor: there is no universal setting. Choose a suitable preset and adjust it, or start from scratch.

Start with low values. Extreme settings may produce undesirable results. Use Band Solo, Mid/Side monitoring, the stereogram, and correlation; evaluate the result with the meters as well as by ear.