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# PROXIMITY

## OPERATIONAL MANUAL

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# 1. PREFACE

**Proximity** is a collaborative effort by **Tokyo Dawn Labs** and **vladg/sound**.

This plug-in is an easy to use distance "pan-pot" based on several psycho-acoustic models. The idea is to give mixing engineer a reliable tool which allows him to manipulate the "depth" of several sound source in a straight forward and sonically convincing manner.

Several models can be combined to taste:

- Distance signal delay by speed of sound.
- Distance gain loss.
- Absorption of high-frequencies in air.
- Stereo width manipulation.
- Proximity effect of virtual microphone.
- Distance based early reflections.

Each model component can be turned on and off. Also this plugin offers *modulation* effect to periodically change the distance by selected law. For example if changing signal delay time can produce Doppler effect, periodical changing of delay time can produce wow and flutter.

Changing the distance using the plugin fader controls the behavior for each model. Distance units can be switched from meters to *feet and inches*.

## 2. COMPATIBILITY

"Proximity" plugin is available in the following versions:

- VST, Windows, 32-bit version (CPU with SSE2 support required).
- VST, Windows, 64-bit version.
- VST, Mac OS X, 32 and 64-bit universal binary version (Intel CPU required).
- AU, Mac OS X, 32 and 64-bit universal binary version (Intel CPU required).

## 3. INSTALLATION

To install "Proximity" plugin on Windows, simply copy the "Proximity.dll" file for the 32-bit version, or the "Proximity-64.dll" file for the 64-bit version, from the zip-format setup archive into your VstPlugins directory (usually c:\VstPlugins, c:\Program Files\Steinberg\VstPlugins; or to another folder of your choice).

To install the "Proximity" plugin on Mac OS X, simply copy the "Proximity.vst" package from the dmg-format setup archive to the /Library/Audio/Plug-Ins/VST directory on your system drive and "Proximity.component" package to /Library/Audio/Plug-Ins/Components (for AU version).

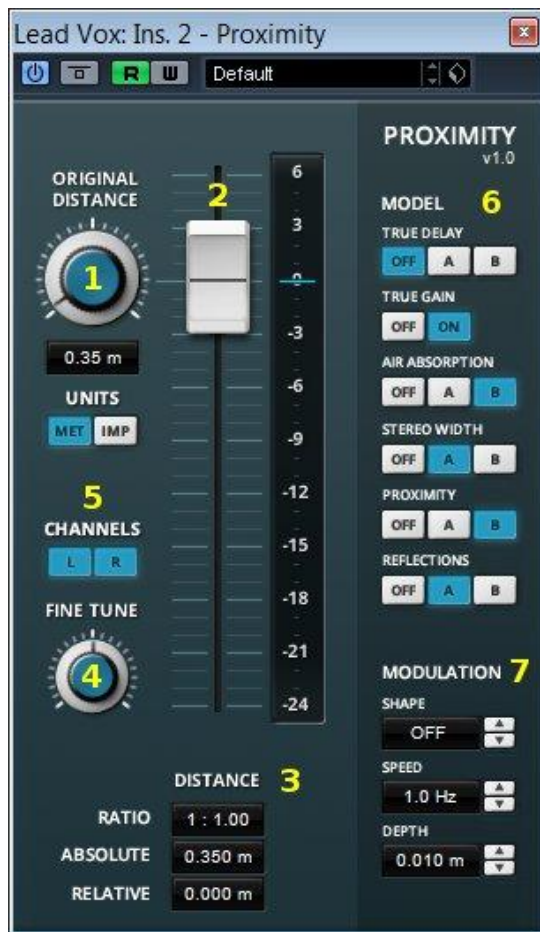
## 4. USE CASES

These are some of typical examples for the usage of "Proximity" plugin:

- Compensation of distance effects in live recorded tracks;
- Subtle enhancements of width and depth;
- Subtle "in your face" effect;
- "Sending away" effect for background sounds and reverb tails;
- Creative Doppler effect with distance delay automation and modulation;
- Pseudo-stereo and artificial double track (ADT) effects;
- Smooth fader automation to free up DAW fader for manual adjustments;
- Fix phase difference in multi-microphone recording.

**Note:** Some audible effect of this plugin will in most cases be very *subtle*.

## 5. "PROXIMITY" PLUGIN CONTROLS



Legend:

- 1) Original distance control
- 2) Main fader
- 3) Modified distance information
- 4) Fine tune control
- 5) Stereo channels control
- 6) Distance model controls
- 7) Modulation controls

## 6.1. ORIGINAL DISTANCE CONTROL

This control allows to set what *distance* is used for model when the main fader is at 0 dB. Also this control used to compute absolute distance to sound source from main plugin fader position. Default value is 0.35 m. For default distance value the virtual microphone model (see "Proximity model") has linear frequency response.

To set default value use Ctrl + mouse click (Command + mouse click on Mac). Mouse wheel can be used to control this knob where "Shift" key affects precision. Also mouse dragging up and down on text label can be used to control the value.

Pushing "MET" (meters) or "IMP" (imperial) button under original distance control allows changing distance units between meters and feet/inches. Selected value stored in user profile so it saved across plugin instances and DAW projects.

## 6.2. MAIN FADER

The main fader looks like regular fader in DAW. It has dB scale. The value from this fader is used to compute absolute distance to sound source. Also this fader value corresponds to gain changes depending on relative distance.

**Example:** Original distance control set to 1 meter. Imagine this is the distance between real sound source and real microphone used to record it. Setting the main fader to +6 dB means we want to achieve effect if sound was recorded closer to microphone in such distance that can produce gain boost of +6 dB. Setting the main fader to -6 dB means we want to achieve effect if sound was recorded farther in such distance that can produce gain loss of -6 dB.

If "True Gain" model is on, the main fader applies amount of gain according to dB scale.

To see actual distance changes see modified distance information.

To set default value of 0 dB use Ctrl + mouse click (Command + mouse click on Mac). Mouse wheel can be used to control this knob where "Shift" key affects precision.

## 6.3. MODIFIED DISTANCE INFORMATION

Modified distance information is written in 3 text labels that shows the distance used for modeling:

- 1) "Ratio" – shows ratio between modified distance and original distance (for example 2:1 shows that distance 2 times shorter than original distance used);
- 2) "Absolute" – shows what absolute distance to virtual sound source used for modeling;
- 3) "Relative" – shows the difference between absolute distance and original distance.

Dragging any of these text labels by mouse up and down can control the main fader position.

## 6.4. FINE TUNE CONTROL

Fine-tune the amount of relative distance without touching the main fader. Ctrl + mouse click (Command + mouse click on Mac) resets "Fine Tune" to zero. Use "Shift" to increase precision. The mouse wheel can be used to control the relative distance as well.

## 6.5. STEREO CHANNELS CONTROL

This plugin supports stereo and mono operational modes:

- In stereo mode (L and R buttons are pushed) both channels are affected. Also width model can be used.
- In mono mode (either L or R button is pushed) only one channel is affected and the second channel passed through. It can be used to adjust delays between L and R channels in multi-microphone stereo recording (drum overheads for example) or for creative artificial double track effects.

**Note:** For mono input, it's a good idea to use only L channel processing. Using this plugin in stereo mode on mono just wastes CPU power without functional benefit.

## 6.6. DISTANCE MODEL CONTROLS

Distance model control allows turning off and on different modules used to achieve a subjective distance effect. You can choose "Type A" or "Type B" operational mode for each module.

### 6.6.1. TRUE DELAY

This module applies signal delay caused by speed of sound (340 meters per second). This module has two distinctive features:

- Smooth delay change allowing creation of Doppler effects.
- Fractional samples delay.

Two different modes are available:

- In **"Type A"** mode the speed of distance change is smoothed by 20 Hz filter (distance can't be changed faster than 1/20 of second).
- In **"Type B"** mode the value specified as modulation speed used for smoothing. So for "0.1 Hz" of modulation speed the signal delay will be changed slowly in 10 seconds.

Fractional samples delay used only for delay less or equal to 3 samples. For example delay of 2.5 samples can be used.

**Example:** For sample rate of 44.1 kHz the signal delay in samples can be calculated using the next formula:  $samples = relative-distance / 340 [m/s] * 44100$

For negative relative distance (the main fader is higher is 0 dB) the plugin can apply reverse delay (the signal start before it was occurred)! It is achieved by using lookahead so the maximum reverse delay is restricted by maximum plugin lookahead value of 0.35 m. If maximum lookahead value is achieved, the text inside relative distance label becomes red.

For fractional delay values used for smooth delay changes high-quality sinc interpolation is used. Due to this, the plugin can consume more CPU power during slow distance changing process.

**Note:** This plugin produces latency compensated by DAW of 109 samples (in 44.1 kHz).

## 6.6.2. TRUE GAIN

This is very simple module. It produces gain changes relative to distance. This value is equal to the main fader position.

True gain module can be turned off to emphasize effects of another modules or when gain changing is not desired.

## 6.6.3. AIR ABSORPTION

This module provides air absorption high-frequency loss model calculated by ISO 9613-1 values (20 C, 40%).

This module also provides reverse effect to remove air loss caused by distance of recording. For example, the sound was recorded at distance of 10 meters. This plugin can compensate high-frequency loss of that distance and give impression of recording at closer distance. Also this reverse effect can be used to achieve high-frequency boost as component of "in your face" effect.

- In **"Type A"** mode the shelving filter is used. This filter uses fixed frequency of 5 kHz. Gain change at this frequency is calibrated by ISO 9613-1 model. Use this mode to apply slight high-frequency boost and loss without making sound dull or sharp.
- In **"Type B"** mode low-pass filter of 12 dB/Oct is used. The filter cutoff frequency (–3 dB point) is calibrated by ISO 9613-1 model. Use this mode for drastic high-frequency operations. For example this mode can be used very well for bright reverb tails processing.

## 6.6.4. STEREO WIDTH

This module provides stereo width modification caused by distance change. It is achieved by M/S processing.

- In **"Type A"** mode simple S channel gain changing related to the main fader position is used. Use this mode to adjust the width of stereo busses or stereo reverb returns.
- In **"Type B"** mode multiband M/S model is used. For positive gain values the width for frequencies above 11 kHz is increased. This is a bit similar to crosstalk effect in analog consoles. For negative gain values the width for frequencies above 500 Hz is decreased. This is useful to put low-frequencies components in the center of recording.

## 6.6.5. PROXIMITY

The so-called "Proximity effect" in unidirectional microphones produces a low-frequency boost as soon the sound source comes in close proximity of the microphone. This effect also leads to low-frequency level loss for distant sounds. Usually each unidirectional microphone has linear low-frequency response only for specified distance.

The "Proximity" module contains virtual microphone proximity effect model (similar to Shure Beta-57A). This model affects low frequencies only. Also this model has reverse action and can be used to add or try to compensate the proximity effect in a recording.

- In **"Type A"** mode additive-subtractive model is used. In first, the plugin tries to remove proximity effect calculated by original distance. After that, the plugin adds modeled proximity effect using absolute distance value. Due to overlaps of two models usually this mode has gentle low-frequency fall and the main fader can be used to control this behavior.
- In **"Type B"** the relative distance value is used. This mode can provide drastic low-frequency boosts or cuts depending on relative distance value. In zero dB main fader position this mode provides linear low-frequency response. This mode can be used a little as part of achieving "in your face" effect.



### 6.6.6. REFLECTIONS

This module generates early reflections that can help human brain to percept distance to sound source (Craven hypothesis). Usually, the signal from unidirectional microphones lacks of early reflections due to directional pattern and such recording may have lack of depth even if it has long reverb tail.

The more distant sound is, the higher is ratio of reflections versus dry signal. So you can turn "true gain" module off and use the main fader to adjust dry/wet ratio in this module.

- In **"Type A"** mode very small amount of repeated delay signal is used. This mode provides very subtle sense of depth without any audible artifacts. It can be used on busses and even on master output.
- In **"Type B"** mode fixed number of early reflections is used. This mode has noticeable comb-filtering effect, which fattens the sound. This mode sounds great on drums and also can add space for DI bass track.

**Note:** Each generated reflection passed through "Air absorption", "Stereo width" and "Proximity" modules if they're turned on.

### 6.7. MODULATION CONTROLS

The modulation section provides controls to apply modulation signal to distance value.

- Shape – shape of modulation (Options: OFF/Sine/Triangle/Sawtooth/Square).
- Speed – modulation frequency (from 0.1Hz to 10Hz).
- Depth – maximum change of distance in modulation (modulated distance is in negative direction, i.e. goes from the listener; the central point in modulated distance is half of the depth value).

## 7. ALTERNATIVE GUI

In addition to main GUI, alternative GUI design is provided. The author is Igor Khomenko. It's located in "alternative\_GUI" folder of installer zip-archive. Use it if you like it!



PIC 1. ALTERNATIVE GUI DESIGN BY IGOR KHOMENKO

## 8. CREDITS

Plugin idea, algorithms, GUI by Fabien Schivre (Tokyo Dawn Labs):

<http://www.tokyodawn.net/tokyo-dawn-labs/>

Additional programming, Mac port by Vladislav Goncharov (vladg/sound):

<http://vladgsound.wordpress.com/>

Alternative GUI design by Igor Khomenko.

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