Chapter 1

Introduction

A.O.M. Audio Plugins is a collection of professional quality audio processors. It is provided as plug-gable software component (a.k.a. “plugins”), and works as a part of your digital audio software.

1.1 Prerequisites

1.1.1 Operating System

• Windows 7 - 10
• Mac OS X 10.9 - 10.14

1.1.2 Plugin Format

• VST
• VST3
• Audio Unit
• AAX Native

1.1.3 Other prerequisites

Processors must support SSE3 instruction set.

Plugins are tested with the latest version of major plugin hosts, such as Cubase, Digital Performer, FL Studio, Live, Logic Pro, Pro Tools, REAPER, Samplitude, SONAR, Studio One, Waveform and Wave-Lab.

1.2 Support

Online support is available. Please email us to helpdesk@aom-factory.jp. You will receive automated response from support ticket system when your message has been received successfully. Support staff can communicate in English or Japanese.

Please include following information if you need technical support.

• Your OS and its version (e.g. Windows 7 Pro 64bit, Mac OS X 10.10)
• Your DAW and its version (e.g. Pro Tools 11, Live 9 32bit)
• Plugin format and version (e.g. VST 32bit version 1.7.3)
• Problem description: which step you are trying, what you expected, what you got actually
Chapter 2

Common Features

Every plugin has common menu bar and status bar on the top and bottom of plugin GUI.

2.1 Common Menu Bar

2.1.1 Menu Button

- **About this product**  Shows plugin name, version, build date, plugin format and other information.
- **Manual**  Opens installed manual (this document).
- **A.O.M. Website**  Opens A.O.M. website using default browser.
- **Install license**  Opens license installation dialog.
- **Show/Hide status bar**  Toggles status bar on the bottom of plugin window.
- **Zoom (Windows only)**  Changes plugin zoom level.
- **Diagnostic Log**  Opens diagnostic log file. A.O.M. Audio Plugins record some events, such as authentication failure or fatal errors, to diagnostic log file. Our support staff may ask you to send the diagnostic log for troubleshooting.
Copy System Stats to Clipboard  Copies several system information to clipboard. It’s helpful to add this information to support request email.

Plugin-specific Settings  Shows Plugin-specific menu if exist. See each plugin’s document for details.

2.1.2 Factory Preset Controls

Some plugins employ factory presets.

**Left Triangle button**  Selects previous preset.

**Right Triangle button**  Selects next preset.

**Preset Selector**  Selects preset with drop-down list.

*Note:* Factory presets are read-only. Please use DAW’s user-preset functionality to store and manage your own presets.

2.1.3 Reset Button

**Reset**

Sets all plugin parameters to each default value. Undoable.

2.1.4 Undo/Redo Buttons

**Undo**  Cancels the last operation and rollback to previous plugin setting.

**Redo**  Does previously cancelled operation again.

2.1.5 Snapshot Buttons

This buttons can be used to compare between two sets of plugin setup.

“Save to A/B/C/D” menus under Snapshot button  Saves current plugin setting to each slot.

**A/B/C/D button**  Loads saved settings. Undoable.
**Note:** Saved settings are volatile, in other words, they will be discarded when project is closed or plugin instance is deleted.

**Note:** A/B comparison feature is superseded by snapshot feature as of version 1.9.5.

### 2.1.6 License Status

![License Status Icon]

Shows current license status.

**Key icon** License is valid.

**Cross mark over key icon, red background** License has been expired or there is no valid license.

### 2.2 Status Bar

#### 2.2.1 Plugin Version

![Plugin Version]

Shows plugin name, format, addressing bit-width and version.

Status bar visibility can be toggled by *Show(Hide) Status Bar* menu in common menu bar.

#### 2.2.2 Peak Meter

![Peak Meter]

**Peak Meter** shows instantaneous sample peak of each channel. When peak exceeds 0dB full-scale, the bar becomes red.

### 2.3 Controls

A.O.M. plugin GUI contains various type of controls. These controls share common behavior over all A.O.M. plugins.
2.3.1 On/Off Button

An on/Off button represents a control with **binary value**. When button is active (typically lighter), the parameter related to the control is on, active or enabled.

<table>
<thead>
<tr>
<th>Area</th>
<th>Operation</th>
<th>Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>Button</td>
<td>Left Click</td>
<td>Toggle value</td>
</tr>
</tbody>
</table>

2.3.2 Button Group

A button group represents **single selection from multiple values**. The button related to current value is shown active (typically lighter).

<table>
<thead>
<tr>
<th>Area</th>
<th>Operation</th>
<th>Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>Button</td>
<td>Left Click</td>
<td>Select value related to the button</td>
</tr>
</tbody>
</table>
2.3.3 Dropdown List

![Dropdown List Image]

A dropdown list represents **single selection from multiple values**. Current selection is shown in the box. **Previous/Next buttons** are visible on hover. Users can select previous or next value by clicking them.

<table>
<thead>
<tr>
<th>Area</th>
<th>Operation</th>
<th>Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>Button</td>
<td>Left Click</td>
<td>Show a selectable value list</td>
</tr>
<tr>
<td>Button</td>
<td>Wheel</td>
<td>Select next or previous value</td>
</tr>
<tr>
<td>Previous/Next button</td>
<td>Left Click</td>
<td>Select previous or next value</td>
</tr>
</tbody>
</table>

2.3.4 Knob

![Knob Image]

A knob represents a **continuous value**. Some knobs come with **value box**, users can directly edit the value.
### Table 2.4: Button group operation

<table>
<thead>
<tr>
<th>Area</th>
<th>Operation</th>
<th>Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knob</td>
<td>Left Drag</td>
<td>Increase or decrease value</td>
</tr>
<tr>
<td>Knob</td>
<td>Left Shift+Drag</td>
<td>Precisely increase or decrease value</td>
</tr>
<tr>
<td>Knob</td>
<td>Left Double-Click</td>
<td>Reset value</td>
</tr>
<tr>
<td>Knob</td>
<td>Left Ctrl+Click</td>
<td>Reset value</td>
</tr>
<tr>
<td>Value Box</td>
<td>Left Click</td>
<td>Begin editing value</td>
</tr>
</tbody>
</table>

#### 2.3.5 Selector Knob

A selector knob represents **single selection from multiple values**.

### Table 2.5: Button group operation

<table>
<thead>
<tr>
<th>Area</th>
<th>Operation</th>
<th>Behavior</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knob</td>
<td>Left Drag</td>
<td>Choose previous or next value</td>
</tr>
<tr>
<td>Knob</td>
<td>Left Double-Click</td>
<td>Reset value</td>
</tr>
<tr>
<td>Knob</td>
<td>Left Ctrl+Click</td>
<td>Reset value</td>
</tr>
</tbody>
</table>
Chapter 3

License Installation

3.1 Demo Mode Display

When plugin fails to find valid licenses, it shows “Demo Mode” dialog over plugin GUI. Under demo mode, plugins operate normally with one exception, it adds small periodical noise.

Install License  Proceeds to install license. License Installation dialog opens.

Buy License  Opens A.O.M. website with default web browser.

Close  Close this dialog and continue trial.

3.2 In-plugin License Installation

As of version 1.9.2, A.O.M. plugins support in-plugin license installation.
3.2.1 Starting License Installation

License installation dialog can be opened by:

- Choosing “License install” menu in plugin menu, or
- Clicking “Install License” button in demo mode dialog.
3.2.2 License Installation Dialog

Drop license file (.aomlicense suffix) into the file-drop area.

3.2.3 Installation result

Plugin shows installation result.

**Note:** Plugin does not support license uninstall. If you would like to check or manage installed licenses, use A.O.M. license manager.
Chapter 4

Cyclic Panner
4.1 Block Diagram

![Block Diagram Image]

4.2 Controls

4.2.1 PAN / WIDTH

Controls the behavior of Pan/Width block.

4.2.2 LPF LINK

Controls the behavior of LPF blocks. When enabled, a low-pass filter is inserted into the opposite channel of current pan slider place.
4.2.3 Input / Output Channel Matrix

Selects the behavior of input/output channel matrix.

**Available values for INPUT**

- **Stereo**  Do nothing
- **Left**  Copy left channel to right channel
- **Right**  Copy right channel to left channel
- **Mid**  Set L+R component to both channels
- **Side**  Set L-R component to both channels
- **M/S Decode**  Set L+R component to left channel, L-R component to right channel

**Available values for OUTPUT**

- **Stereo**  Do nothing
- **Left**  Copy left channel to right channel
- **Right**  Copy right channel to left channel
- **M/S Encode**  Set L+R component to left channel, L-R component to right channel
- **Swap L/R**  Swap left and right channel
4.3 Field Meter

Field Meter shows current distribution of sound field. Smoothing window size can be changed by SPEED control.
Chapter 5

Invisible Limiter
5.1 Block Diagram

- Bypass unless channel mode is "M/S".
- With the threshold specified by "LIMIT LEVEL".
- Bypass if overshoot is "THRU".
- Negative of input gain is added if "unity gain monitoring" is enabled.
5.2 Gain Controls

Input Gain knob controls the gain applied to signal before limiting.

Limit Level knob controls the threshold used in “Limit” block above.

Output Gain knob controls the gain applied to signal before final output.

**Note:** If you want to use Invisible Limiter as an one-knob limiter, you should operate **Input Gain** knob.

5.3 Bypassing and Unity Gain Monitoring

When **Bypass** indicator is lighting red, plugin bypasses all processing.

When **Unity Gain Monitoring** indicator is red, the negative of input gain is added to output gain. Unity gain monitoring helps users to monitor output at the same level of input. Try toggling bypass button after unity gain monitoring enabled.
5.4 Tweaks

5.4.1 Channel Mode

Controls how should Invisible Limiter deal channels. 

**L/R** Left and right channels are processed separately.  
**M/S** Middle and side channels are processed separately.

5.4.2 Shape

Select the curve shape of time-varying reduction amount. See the figure below to find the shape of each option.

5.4.3 Oversampling

Controls oversampling factor. Higher factor brings cleaner sound and higher CPU load. Setting “1x” means no oversampling.

5.4.4 Latency

Controls plugin latency. See Technical Resources for actual value of plugin latency.
5.4.5 Overshoot

Controls the behavior of overlevel protection.

**Suppress**  Removes overshoot by adding small amount of reduction.

**Clip**  Removes overshoot by clipping.

**Thru**  Does nothing. This is useful for limiter chaining.

5.5 Meters

**Reduction Meter**  shows current peak reduction amount. The number at the top of reduction meter indicates a long-term maximum reduction level. The value can be reset by left click.

**Output Peak Meter**  shows current peak output level.
Chapter 6

Invisible Limiter G2
6.1 Block Diagrams

6.1.1 Overall

6.1.2 Limiter Sub-block

6.2 Operation Modes

Invisible Limiter G2 has two operation modes.

**Easy mode** includes essential controls for final brick-wall limiting. **Advanced mode** is for experts, allows full control of the limiter. There is no difference in internal algorithm of the limiter.
Modes can be toggled by square-shaped button at the right top of GUI or “Switch to [Advanced/Easy] mode” menu.

### 6.3 Gain Controls

**Gain knob** Controls the gain amount applied before limiting.

**Six-segment gain buttons** enable stepwise control in 1dB, 0.1dB, 0.01dB.

This parameter can be operated by MIDI note-on.

<table>
<thead>
<tr>
<th>Note Number</th>
<th>International</th>
<th>Yamaha</th>
<th>Operation</th>
</tr>
</thead>
<tbody>
<tr>
<td>66</td>
<td>F#3</td>
<td>F#4</td>
<td>+1dB</td>
</tr>
<tr>
<td>65</td>
<td>F3</td>
<td>F4</td>
<td>-1dB</td>
</tr>
<tr>
<td>68</td>
<td>G#3</td>
<td>G#4</td>
<td>+0.1dB</td>
</tr>
<tr>
<td>67</td>
<td>G3</td>
<td>G4</td>
<td>-0.1dB</td>
</tr>
<tr>
<td>70</td>
<td>A#3</td>
<td>A#4</td>
<td>+0.01dB</td>
</tr>
<tr>
<td>69</td>
<td>A3</td>
<td>A4</td>
<td>-0.01dB</td>
</tr>
</tbody>
</table>

**Ceiling knob** controls threshold which the output signal should not exceed. You can set this control to lower value if you use the limiter in tracks or buses. 0.00dB is not recommended when using dither.

### 6.4 Bypassing and Unity Gain Monitoring

When **Bypass** indicator is active (blue), plugin bypasses all processing.

When **Unity Gain Monitoring** indicator is active (blue), the negative of input gain is added to output gain. Unity gain monitoring helps users to monitor output at the same level of input. Try toggling bypass button after unity gain monitoring enabled.
6.5 Overall Tweaks

**Quality** selector controls internal processing frequency. Actual internal frequency is displayed beside of the quality setting.

**Note:** It's not true that the higher value always brings 'good' result. Choose this value carefully with your own ears.

**Mid / Side switch** toggles MS Encode/Decode sub-blocks. When enabled, most of signal path works for M/S pair instead of L/R pair. Mid/Side processing is available only in stereo channel configuration. Under other channel configurations, the state of this switch is just ignored.

**BIAS switch** makes sound fat/warm a bit.

**Mode** selector controls current processing mode (limiting algorithm).

- **Modern** This mode has been newly introduced in Invisible Limiter G2.
- **Modern II** Cleaner and more transparent than Modern mode.
- **Suppress** This mode is similar to Invisible Limiter's Suppress mode.
- **Clip** This mode is similar to Invisible Limiter's Clip mode.
- **Through** This mode is similar to Invisible Limiter's THRU mode.

**Wet Mix** knob controls mix ratio between input signal and processed signal. If you're intended to do parallel compression, this control is useful.
When **DC Cut lamp** is lighting, the high-pass filter before limiting is engaged.

### 6.6 Peak Detector Tweaks

**SC HPF (Sidechain hi-pass filter)** knob controls cutoff frequency of high-pass filter inserted into internal envelope detector chain. This feature can be used to exclude bass frequency from peak detection, or to configure the limiter as a simple de-esser.

### 6.7 Reduction Generator Tweaks

#### 6.7.1 Shape Controls

**Attack Knob**  Controls transition curve of reduction amount in attack phase.

**Attack Shape LED Button**  When enabled (blue), the shape of transition curve in attack phase is changed from exponential to sigmoidal.

**Release Knob**  Controls transition curve of reduction amount in release phase.

**Release Shape LED Button**  When enabled (blue), the shape of transition curve in release phase is changed from exponential to sigmoidal.

**Shape Mode Select**  Changes behavior of internal reduction-shape control. This will be effective only in Modern mode.

See Fig. 6.1 and Fig. 6.2 for curve shapes.
6.7.2 Soft Knee

Soft knee knob controls soft knee amount. Fig. 6.3 shows compression curves for typical settings.
6.7.3 Channel Link

Controls channel link amount. 0% means fully unlinked. 100% means fully linked.

6.7.4 Manual Attack/Release Controls

**Attack Time LED Button** Activate or deactivate manual attack time behavior.

**Attack Time Knob** Controls attack time. When manual attack is enabled, the limiter enters ‘Compressor-Style’ because it cannot guarantee nonexistence of peak exceeding in output signal.

**Release Time LED Button** Activate or deactivate manual release time behavior.

**Release Time Knob** Controls release time.

Fig. 6.3: Compression curves for typical soft knee settings. Log scale.
Release Mode Select: Changes internal behavior related to manual release time setting. This will be effective only in Modern mode.

### 6.8 Meters and Indicators

#### 6.8.1 Compressor-Style indicator

Compressor-Style indicator becomes visible when:

- Wet Mix control is set otherwise than 100%.
- Mid / Side processing is enabled.
- Manual Attack Time is enabled.
- SC HPF is enabled.

**Note:** When this indicator is visible, the limiter allows peak exceeding in output signal.

#### 6.8.2 Reduction Meter

Shows current reduction amount.

- **Bar** Represents the latest value of reduction amount.
- **Single Blue Segment** Represents short term maximum value of reduction amount.
- **Single White Segment** Represents long term maximum value of reduction amount. Can be reset by clicking meter.

Clicking magnifier icon toggles zoom level of the meter.

#### 6.8.3 Output Level Meter

Shows current output level.

- **Bar** Represents the latest RMS/VU level of output signal.
- **Single Segment (Green / Yellow / Red)** Represents the latest sample peak level of output signal.
- **Single Segment (White)** Represents current value of CEILING parameter.

Clicking magnifier icon toggles zoom level of the meter.
6.8.4 Meter Settings

**Peak-RMS** Shows RMS and Peak value.

**Peak-VU** Shows VU and Peak value.

**K-12, K-14, K-20** Shows RMS and Peak value. Meter scale is optimized for K-12/K-14/K-20.

**K-12/VU, K-14/VU, K-20/VU** Shows VU and Peak value. Meter scale is optimized for K-System\(^1\) K-12/K-14/K-20.

**Note:** Integration time of the RMS/VU meter is fixed to 600ms to follow K-System specification.

**Note:** Static offset is added to raw RMS/VU computed value to follow AES17 standard.

**K-WEIGHTED**

When **K-Weighted Switch** is active (filled), "K" frequency weighting (specified in ITU-R BS.1770-3 Annex \(^1\)\(^2\)) is applied before RMS/VU calculation.

**INPUT OVLD**

**Input Overload Indicator** becomes active (red) when sample peak exceeds 0dBFS at the entry of plugin.

6.9 Dither

**Dither Type Select** Selects dither type. See the table below for each type.

**Dither Bit Depth Select** Selects dither bit depth.

**Auto Black Button** When active, dither signal is automatically muted for very low level input signal.

<table>
<thead>
<tr>
<th>Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>----</td>
<td>Does nothing. Dithering block is completely bypassed.</td>
</tr>
<tr>
<td>Flat</td>
<td>Applies 2-LSB TPDF dither.</td>
</tr>
<tr>
<td>Acoustic</td>
<td>Applies original colored dither.</td>
</tr>
<tr>
<td>Electronic</td>
<td>Applies original noise-shaped dither.</td>
</tr>
<tr>
<td>Truncate</td>
<td>Truncates signal to selected bit-depth. No dither noise is added.</td>
</tr>
</tbody>
</table>

\(^1\) http://www.digido.com/how-to-make-better-recordings-part-2.html

\(^2\) https://www.itu.int/dms_pubrec/itu-r/rec/bs/R-REC-BS.1770-3-201208-S!!PDF-E.pdf
Chapter 7

Sakura Dither
7.1 Controls

**Depth** selector controls output bit depth of dithered signal.

**Type** selector controls dither type.
- **Type 1** Natural / Transparent
- **Type 2** Open / Wide
- **Type 3** Warm / Slight de-esser feelings
- **Type 4** Electronic / Enhancement

When **Auto Black** is enabled (lighting), output is muted if input signal fall below threshold level. **ACTIVE** indicator lights up when auto-black is working.

<table>
<thead>
<tr>
<th>Depth</th>
<th>Threshold Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>8</td>
<td>-84dBFS</td>
</tr>
<tr>
<td>16</td>
<td>-132dBFS</td>
</tr>
<tr>
<td>24</td>
<td>-180dBFS</td>
</tr>
</tbody>
</table>
7.2 Meters

**Input / Output Resolution** displays shows detected input and output bit resolution.

- **N/A** Failed to detect bit depth (likely no signal)
- **8** From 1 bit through 8 bit.
- **16** From 9 bit through 16 bit.
- **24** From 17 bit through 24 bit.
- **32f** More than 24bit or 32-bit floating point.
- **64f** 64-bit floating point.

7.3 Plugin-Specific Menu

7.3.1 Deterministic Noise Source

**Checked** All dither instances generate a same dither noise sequence after playback. This enables to get exactly same result beyond multiple bounces of same source, same range. This behavior might not be achieved depending to DAW’s actual plugin initialization implementation. Appropriate for single dither instance configuration, and you need to get exactly same result between bounces.

**Unchecked (default)** Every dither instances generate different noise sequence. Appropriate for single or multiple dither instance configuration, e.g. final master or outboard send preprocess.
Chapter 8

Stereo Imager D
8.1 Controls

**Center Gain** knob controls the gain change about center component. 100% means unity gain.

**Side Gain** knob controls the gain change about side component. 100% means unity gain.

When **Auto Gain** is enabled (lighting), plugin applies inverse of (center + side) gains.

When **Bypass** is enabled, plugin bypasses all processing when enabled.

8.2 Phase Meter

Phase Meter displays processed signal in Lissajous style.
8.3 Backward Compatibility Menu

Older versions of Stereo Imager D had a bug in processing algorithm, that the frequency range above 1/4 sampling rate (e.g. 11025-22050Hz under 44100Hz sampling rate project) doesn't get processed.

By turning off this menu, the new (bug-fixed) algorithm becomes active. This menu is ticked by default, thus the plugin uses old algorithm for compatibility.

Introduced in version 1.7.4.
Chapter 9

tranQuilizr
9.1 Equalizer Sections

**In button** toggle band on/off. When lighting, band is enabled.

**Solo button** toggle band solo mode. When lighting, band is in solo mode. When at least one band is set to solo mode, all other bands are muted.

**Frequency knob** control center frequency of each equalizer band.

**Gain knob** control gain of each equalizer band.

**Width knob** control band width of each equalizer band.

**Equalizer Type buttons** select equalizer's sound. Bright button indicates current equalizer type.
- **Type A** Original minimum-phase equalizer.
- **Type B** Original maximum-phase equalizer.
- **Type C** Conventional biquad equalizer.

**Shelf button** toggle peaking / shelving equalizer. Bright button indicates shelving.

**Channel knob** select the channel that the equalizer should process. For example, when the band is set to L, the band proceses only left channel.

9.2 Filter Sections

**In button** toggle band on/off. When lighting, band is enabled.
Solo button toggles band solo mode. When lighting, band is in solo mode. When at least one band is set to solo mode, all other bands are muted.

Frequency knob controls center frequency of each equalizer band.

Slope knob selects filters slope. For larger value, the filter reduces stopband more.

Channel knob selects the channel that the equalizer should process. For example, when the band is set to L, the band processes only left channel.

9.3 Total Section

Total-In button toggles overall on/off of plug-in processing.

Output Gain knob controls output gain. Output gain is applied at the end of processing chain, just before output meter.

M/S Width knob controls mid/side width. Turning to left, middle component is boosted and side component is reduced.

Phase Invert button toggles phase invert.

Monitor Channel knob selects channel to be monitored.
Automatic Gain Compensation (AGC) button Toggles on/off of Automatic Gain Compensation (AGC).

White line indicates actual equalizing curve. If AGC is enabled, compensational total gain is added to set averaged gain to 0dB.

Lo-Cut and Hi-Cut filter settings don't affect to AGC behavior.

Quality button group selects processing quality.

Plug-in's internal sample rate is changed according to the table below.

<table>
<thead>
<tr>
<th>Project samplerate</th>
<th>Quality=1</th>
<th>Quality=2</th>
<th>Quality=3</th>
<th>Quality=4</th>
<th>Quality=5</th>
</tr>
</thead>
<tbody>
<tr>
<td>44.1kHz</td>
<td>88.2kHz</td>
<td>176.4kHz</td>
<td>352.8kHz</td>
<td>705.6kHz</td>
<td>1411.2kHz</td>
</tr>
<tr>
<td>48kHz</td>
<td>96kHz</td>
<td>192kHz</td>
<td>384kHz</td>
<td>768kHz</td>
<td>1536kHz</td>
</tr>
<tr>
<td>88.2kHz</td>
<td>88.2kHz</td>
<td>176.4kHz</td>
<td>352.8kHz</td>
<td>705.6kHz</td>
<td>1411.2kHz</td>
</tr>
<tr>
<td>96kHz</td>
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<td>192kHz</td>
<td>384kHz</td>
<td>768kHz</td>
<td>1536kHz</td>
</tr>
<tr>
<td>176.4kHz</td>
<td>176.4kHz</td>
<td>176.4kHz</td>
<td>352.8kHz</td>
<td>705.6kHz</td>
<td>1411.2kHz</td>
</tr>
<tr>
<td>192kHz</td>
<td>192kHz</td>
<td>192kHz</td>
<td>384kHz</td>
<td>768kHz</td>
<td>1536kHz</td>
</tr>
</tbody>
</table>

9.4 Paragraphic Equalizer Area
9.4.1 Equalizer/Filter knots

Controls each parameter of the selected band.

Table 9.2: Knot Operations (Windows)

<table>
<thead>
<tr>
<th>Modifier</th>
<th>Operation</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>(none)</td>
<td>Left Drag</td>
<td>Changes frequency and gain</td>
</tr>
<tr>
<td>Ctrl</td>
<td>Left Drag</td>
<td>Changes frequency</td>
</tr>
<tr>
<td>Shift</td>
<td>Left Drag</td>
<td>Changes gain</td>
</tr>
<tr>
<td>Ctrl + Shift</td>
<td>Left Drag</td>
<td>Changes bandwidth</td>
</tr>
<tr>
<td>Alt</td>
<td>Left Drag</td>
<td>Changes bandwidth</td>
</tr>
<tr>
<td>(none)</td>
<td>Right Click</td>
<td>Toggles band on/off</td>
</tr>
<tr>
<td>Ctrl</td>
<td>Right Click</td>
<td>Toggles band solo</td>
</tr>
<tr>
<td>Shift</td>
<td>Right Click</td>
<td>Toggles equalizer types or filter slopes</td>
</tr>
<tr>
<td>(none)</td>
<td>Wheel</td>
<td>Changes gain</td>
</tr>
<tr>
<td>Ctrl</td>
<td>Wheel</td>
<td>Changes frequency</td>
</tr>
<tr>
<td>Ctrl + Shift</td>
<td>Wheel</td>
<td>Changes bandwidth</td>
</tr>
<tr>
<td>Alt</td>
<td>Wheel</td>
<td>Changes bandwidth</td>
</tr>
</tbody>
</table>

Table 9.3: Knot Operations (Mac OS X)

<table>
<thead>
<tr>
<th>Modifier</th>
<th>Operation</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>(none)</td>
<td>Left Drag</td>
<td>Changes frequency and gain</td>
</tr>
<tr>
<td>Command</td>
<td>Left Drag</td>
<td>Changes frequency</td>
</tr>
<tr>
<td>Shift</td>
<td>Left Drag</td>
<td>Changes gain</td>
</tr>
<tr>
<td>Command + Shift</td>
<td>Left Drag</td>
<td>Changes bandwidth</td>
</tr>
<tr>
<td>Option</td>
<td>Left Drag</td>
<td>Changes bandwidth</td>
</tr>
<tr>
<td>(none)</td>
<td>Right Click</td>
<td>Toggles band on/off</td>
</tr>
<tr>
<td>Command</td>
<td>Right Click</td>
<td>Toggles band solo</td>
</tr>
<tr>
<td>Shift</td>
<td>Right Click</td>
<td>Toggles equalizer types or filter slopes</td>
</tr>
<tr>
<td>(none)</td>
<td>Wheel</td>
<td>Changes gain</td>
</tr>
<tr>
<td>Command</td>
<td>Wheel</td>
<td>Changes frequency</td>
</tr>
<tr>
<td>Command + Shift</td>
<td>Wheel</td>
<td>Changes bandwidth</td>
</tr>
<tr>
<td>Option</td>
<td>Wheel</td>
<td>Changes bandwidth</td>
</tr>
</tbody>
</table>

**Note:** Alt or Option modifier key may not work on some hosts.
9.4.2 Peak meter

Shows current peak of input and output signals. Peak indicators are placed at the top of input/output meters. Peak indicators get active (red color) when the meter found a sample peak exceeding 0dB full scale.

9.4.3 Quick Help Button

Shows graphical operation guide on the top of plugin GUI.

9.4.4 Analyzer Menu

Controls analyzer behavior.
Show PRE  Toggles pre-processing analyzer visibility
Show POST Toggles post-processing analyzer visibility
Mode  Selects analyzer mode.
   Instant  Displays plain frequency response.
   Peak Hold  Displays maximum level after last reset.
   Accumulate  Displays average level after last reset.
Bands  Selects octave band display.
Speed  Selects falldown speed.
Slope  Selects tilt offset added to frequency response curve.
Range  Selects level range to display.
Offset  Selects constant offset added to frequency response curve.
Introduced in version 1.7.4.

9.4.5 Reset Button

In Peak Hold mode and Accumulate mode of analyzer, this button clears analyzer internal state. Introduced in version 1.7.4.
9.4.6 Hold Button

Suspends updating frequency response curve.
Introduced in version 1.7.4.

9.4.7 Curve Menu

Controls equalizer/filter curve display.
- **Range**: Selects display range of equalizer/filter curve.
- **Channel**: Selects visible channel of equalizer/filter curve. Only bands of selected channel become visible. As an exception, all bands are visible under Channel=ALL setting.

9.5 Other Control

**All Equalizers Type button** selects the type of all equalizer's type by clicking.

9.6 Plugin-Specific Menu

In **Ear-Only mode**, plugin hides paragraphic equalizer area.

9.7 Memorized Settings

Following plugin settings are memorized and used as default value of new plugin instance.
- Analyzer / Show PRE
- Analyzer / Show POST
- EQ Curve Range
- AGC
- Quality
Chapter 10

Wave Shredder
10.1 Controls

Examples in this section are obtained from the input waveform below.

10.1.1 Rate Reducer

Performs zeroth-order hold. Rate reduce control specifies the duration of holding.

10.1.2 Gate
Drops waveform under the threshold, to zero.

When mode is DC, the gate performs zero-order hold at the threshold.

10.1.3 Chop

Drops waveform over the threshold, to zero.

When mode is DC, the chopper performs zero-order hold at the threshold.
10.1.4 Cut/Fold

For removing settings, Wave Shredder removes positive or negative part of input waveform.

For folding settings, Wave Shredder inverts positive or negative part of input waveform.

10.1.5 Bit Crush
Performs bit-depth reduction. For the setting of 2.0 bit, we have the waveform below.

![Waveform Example](image)

### 10.1.6 DC Cut

When DC Cut is enabled, Wave Shredder applies high-pass filter at very low frequency. The filter removes offset from waveform.

The following example is applied DC Cut after folding up.

![DC Cut Example](image)

### 10.1.7 Mix

Specifies the ratio of original input waveform and processed waveform.

For rate reducing and mix at 50%, we have the waveform below.

![Mix Example](image)
10.1.8 Bypass

Bypass all processing when enabled.

10.1.9 Gain

Adds gain to output signal.
Introduced in version 1.7.4.
Chapter 11

Technical Resources

11.1 Supported Channel Configuration

Table 11.1: Supported Channel Configuration (in/out).

<table>
<thead>
<tr>
<th></th>
<th>Mono/Mono</th>
<th>Mono/Stereo</th>
<th>Stereo/Stereo</th>
<th>3/3 to 8/8</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cyclic Panner</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Invisible Limiter</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Invisible Limiter G2</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Sakura Dither</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Stereo Imager D</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>tranQuilizr</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Wave Shredder</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
</tbody>
</table>

Note: Configurations from 3/3 to 8/8 are not supported in VST2 format

11.2 Plugin Latency

Table 11.2: Project Sample Rate vs Plugin Latency in samples

<table>
<thead>
<tr>
<th></th>
<th>44.1kHz</th>
<th>48kHz</th>
<th>88.2kHz</th>
<th>96kHz</th>
<th>176.4kHz</th>
<th>192kHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cyclic Panner</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Invisible Limiter (normal)</td>
<td>2301</td>
<td>2496</td>
<td>4506</td>
<td>4896</td>
<td>8916</td>
<td>9696</td>
</tr>
<tr>
<td>Invisible Limiter (low)</td>
<td>316</td>
<td>336</td>
<td>537</td>
<td>576</td>
<td>978</td>
<td>1056</td>
</tr>
<tr>
<td>Invisible Limiter G2</td>
<td>3675</td>
<td>4000</td>
<td>7350</td>
<td>8000</td>
<td>14700</td>
<td>16000</td>
</tr>
<tr>
<td>Sakura Dither</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Stereo Imager D</td>
<td>4096</td>
<td>4096</td>
<td>8192</td>
<td>8192</td>
<td>16384</td>
<td>16384</td>
</tr>
<tr>
<td>tranQuilizr</td>
<td>64</td>
<td>64</td>
<td>64</td>
<td>64</td>
<td>64</td>
<td>64</td>
</tr>
<tr>
<td>Wave Shredder</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
Table 11.3: Project Sample Rate vs Plugin Latency in milliseconds

<table>
<thead>
<tr>
<th>Plugin</th>
<th>44.1kHz</th>
<th>48kHz</th>
<th>88.2kHz</th>
<th>96kHz</th>
<th>176.4kHz</th>
<th>192kHz</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cyclic Panner</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Invisible Limiter (normal)</td>
<td>52.2</td>
<td>52.0</td>
<td>51.1</td>
<td>51.0</td>
<td>50.5</td>
<td>50.5</td>
</tr>
<tr>
<td>Invisible Limiter (low)</td>
<td>7.2</td>
<td>7.0</td>
<td>6.1</td>
<td>6.0</td>
<td>5.5</td>
<td>5.5</td>
</tr>
<tr>
<td>Invisible Limiter G2</td>
<td>83.3</td>
<td>83.3</td>
<td>83.3</td>
<td>83.3</td>
<td>83.3</td>
<td>83.3</td>
</tr>
<tr>
<td>Sakura Dither</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Stereo Imager D</td>
<td>92.9</td>
<td>85.3</td>
<td>92.9</td>
<td>85.3</td>
<td>92.9</td>
<td>85.3</td>
</tr>
<tr>
<td>tranQuilizr</td>
<td>1.5</td>
<td>1.3</td>
<td>0.7</td>
<td>0.7</td>
<td>0.4</td>
<td>0.3</td>
</tr>
<tr>
<td>Wave Shredder</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
Chapter 12

Library Licenses

12.1 zlib

http://www.zlib.net/

/* zlib.h -- interface of the 'zlib' general purpose compression library
 version 1.2.11, January 15th, 2017

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http://www.libpng.org/pub/png/libpng.html

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http://eigen.tuxfamily.org/

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https://github.com/kazuho/picojson

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http://www.boost.org/

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https://github.com/chrismsimpson/Metropolis

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