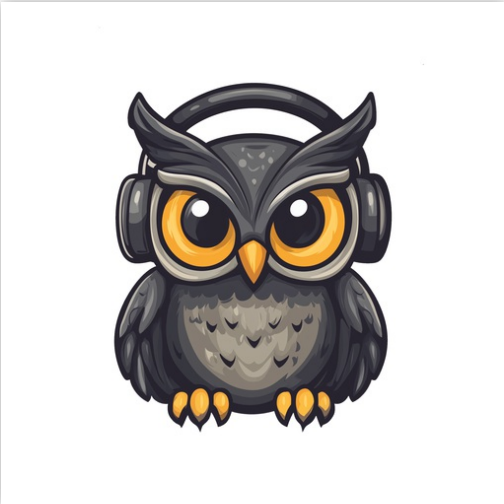
APU Loudness Contour



User Manual
v4.4.7

Table of Contents

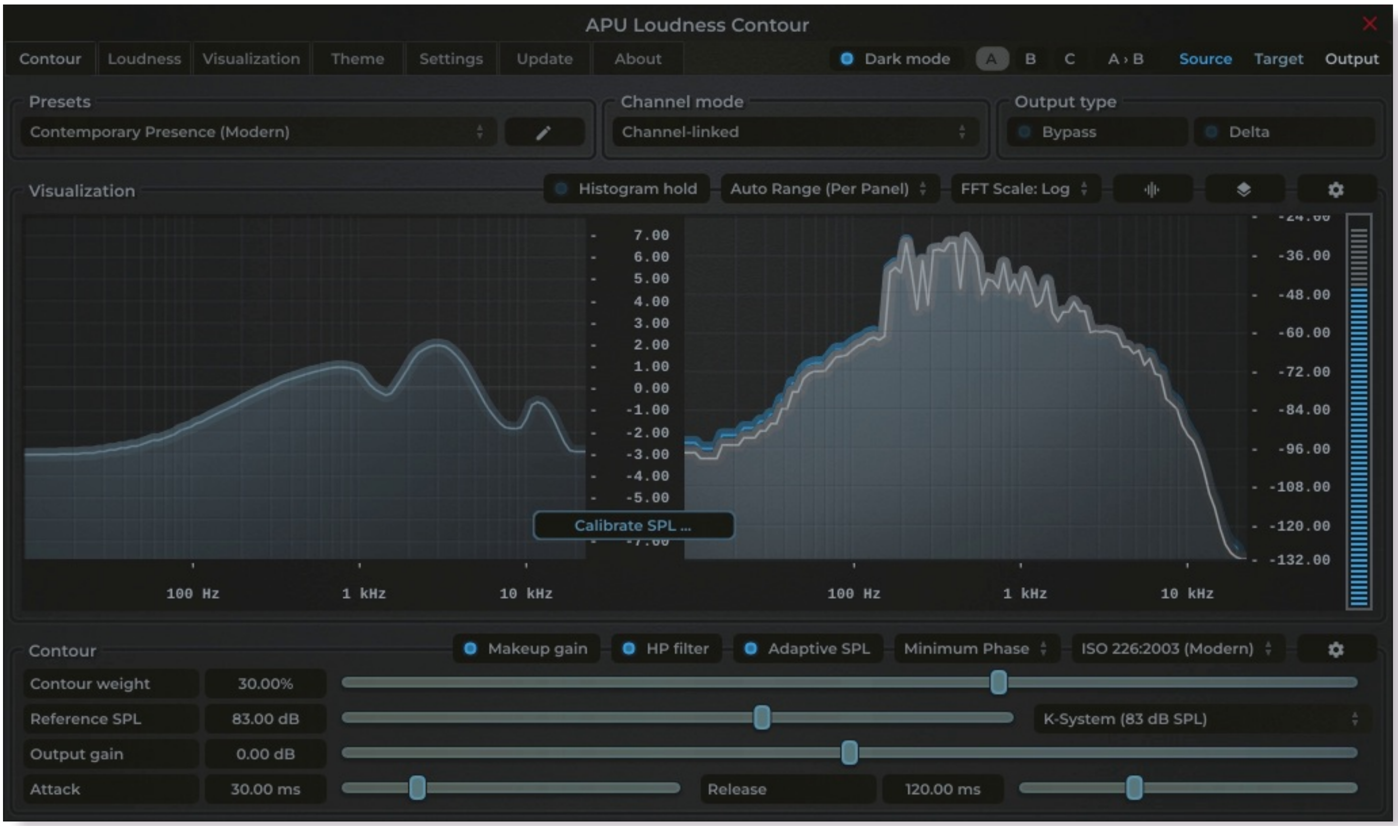
1. Introduction

APU Loudness Contour is an ‘equal-loudness’ contour plug-in released by APU Software, LLC. This plug-in is designed to apply a variety of ‘equal-loudness’ filters to audio. Here you can read about the different features and parameters available with the plug-in.

2. Parameters

This software supports a variety of parameters, most of which can be adjusted in real-time. This section provides an overview of each parameter, with each subsection detailing the parameters for the associated tab in the user interface. From within the user interface, you can also hover the mouse over a slider, combo-box, or checkbox to see a popup description of the parameter.

2.1. Contour



The contour tab contains configuration and visualization for loudness contours. This section details each of the individual parameters and components.

To ensure Contour’s perceptual modeling is accurate for your specific environment, a simple **calibration** process aligns the plugin with the true Sound Pressure Level at your listening position.

The process is straightforward. First, place an **SPL meter** at your listening spot, using a **C-weighted, slow response** setting. In the plugin, click the **“Calibrate SPL …”** button to play a **band-limited pink noise** signal (a **1 kHz sine wave option** is also available). Now, simply adjust your speaker volume and/or the **reference SPL** parameter until the reading on your external SPL meter matches the reference level set within TrueGain (for example, 83 dB SPL).

For convenience, you can also toggle through standard reference levels using the drop-down next to the reference SPL parameter.

Once calibrated, all of the plugin’s loudness simulations and compensations are precisely matched to your physical listening environment.

> The calibration button is only visible for SPL-dependent loudness contour types (ISO-226:2003, ISO-226:2023, Fletcher-Munson).

2.1.1. Presets

Loudness Contour's presets combo-box contains a collection of basic presets.

> You can configure whether or not to load preset visuals when switching between presets, and you can switch between loading dark or light themes through the dark mode parameter.

Currently, the following presets are available ("Full Reset" restores all default parameter values):

- Full Reset
- Contemporary Presence (Modern)
- Nuanced Presence (Refined)
- Technical Mid-Boost (Precise)
- A-Weighted Presence (Environmental)
- Perceptual Clarity (LUFS)
- Vintage Mids EQ (Classic)
- Gentle Mid Shift (High-SPL)
- Hiss Focus EQ (Broadcast)
- Spectral Histogram (Flat)
- Loudness Compensation (Modern)
- Loudness Compensation (Refined)
- Loudness Compensation (Precise)
- Loudness Compensation (Environmental)
- Loudness Compensation (LUFS)
- Loudness Compensation (Classic)
- Subtle Loudness Compensation (High-SPL)
- Creative Scoop EQ (Broadcast)

2.1.2. Channel mode

The channel mode parameter determines which channel the visualizer shows. Channel-linked shows the average of all channels, while channel-split shows only the selected channel.

2.1.3. Output type

The output type options allows you to configure which type of samples to output.

- Default output type corresponds to Loudness Contour's output
- Bypass output type corresponds to Loudness Contour's source
- Delta output type corresponds to Loudness Contour's output minus source

> Output gain and dry/wet are bypassed for Delta output type

2.1.4. Visualization

The visualization component displays a continuously evolving real-time view of your source, target, and output spectrum over time.

> You can hover the mouse over a bucket to see the frequency range and loudness the bucket corresponds to.

Detailed visualization settings can be adjusted from the visualization tab, with some features also available by right clicking on the visualization component.

> You can double-click the visualization component to resize and hide everything else.

2.1.5. FFT scale type

The FFT scale type parameter determines the frequency scale used for the visualization. The following options are available:

- Linear: Linear frequency scale with frequency labels
- Log: Logarithmic frequency scale with frequency labels
- Note: Logarithmic frequency scale with note labels

2.1.6. FFT window type

The FFT window type parameter determines the window type used for the spectral histogram's FFT. The following options are available:

- Rect: Rectangular window
- Hann: Hann window
- Hamming: Hamming window
- Blackman: Blackman window
- Kaiser: Kaiser window

> When using the Kaiser window, the Kaiser beta parameter is used to determine the window shape.

2.1.7. FFT window size

The FFT window size parameter determines the size of the spectral histogram's FFT window.

> The FFT window size determines a trade-off between frequency resolution and time resolution. A larger window size provides better frequency resolution, while a smaller window size provides better time resolution.

2.1.8. Kaiser beta

The Kaiser beta parameter determines the shape of the window when Kaiser FFT window type is selected.

2.1.9. Raster type

The raster type parameter allows you to enable/disable the spectral histogram raster visualization.

2.1.10. Raster orientation

The raster orientation parameter allows you to specify the rotation of the raster visualization. You can select between horizontal and vertical orientations.

2.1.11. Play calibration signal

The play calibration signal parameter allows you to play a calibration signal through the source signal. This allows you to calibrate reference SPL with your playback system.

> Calibration signal type determines the type of calibration signal played.

> See Contour for general calibration process

2.1.12. Calibration signal type

The calibration signal type parameter determines the type of calibration signal played when play calibration signal is enabled. The following options are available:

- Speakers: Pink Noise (Band-Limited)
- Speakers: Sine Wave at 1 kHz
- Speakers: Pink Noise (Full Bandwidth)
- Headphones: Dialog (Male)
- Headphones: Dialog (Female)

> See Contour for general calibration process

2.1.13. Calibration offset

The calibration offset parameter is used to help calibrate the Reference SPL as part of the headphones calibration process.

> See Contour for general calibration process

2.1.14. Makeup gain

The makeup gain parameter enables an estimated makeup gain for the current loudness contour type.

The amount of makeup gain is determined by the difference in ungated LUFS measurement between an unfiltered pink noise signal and the filtered pink noise signal. This gain is automatically interpolated between contours when appropriate.

> Makeup gain is an estimate, you can adjust the output gain parameter to fine-tune the output level.

> Makeup gain is reflected in the contour visualization, unlike the output gain parameter.

2.1.15. High-pass filter

The high-pass filter parameter allows you to enable or disable a high-pass filter on the input signal. This can be used to remove low-frequency noise from the input signal.

> The high-pass filter only prevents boosting of low frequencies, it does not prevent attenuation. This means that the high-pass filter can be used to remove low-frequency noise from the input signal without negatively impacting loudness compensation.

> True gain is reflected in the contour visualization.

2.1.16. Adaptive SPL

The adaptive SPL parameter allows you to enable or disable dynamic adjustment of the reference SPL based on the input signal. This can be used to improve the accuracy of loudness compensation in dynamic audio.

Adaptive SPL adjustments are based on the current loudness type configuration. When using a channel-split loudness type, adaptive SPL operates separately for each channel.

> You can control the range of adjustment using the reference offset parameters.

2.1.17. Phase mode

The phase mode parameter determines the phase mode used for the FIR filters. The following options are available:

- Minimum: Minimum phase mode
- Linear: Linear phase mode

2.1.18. Loudness contour type

The loudness contour type parameter determines the type of loudness contour used for filtering. The following options are available:

- None
- K-weighting
- ECMA-418
- ISO-226:2003
- ISO-226:2023
- Fletcher-Munson
- ITU-R 468
- A-weighting
- C-weighting

2.1.19. Ballistics type

The ballistics type combo-box allows you to change Loudness Contour's ballistics behavior.

- Natural (dithered) applies light dithering to natural ballistics deltas.
- Natural (direct) applies normal smooth attack and release ballistics.
- Inertial (dithered) applies light dithering to inertial ballistics deltas.
- Inertial (direct) applies attack and release ballistics with inertia.

> Inertial ballistics are more responsive to sudden changes in loudness, but may sound less natural.

> Dithering can help reduce quantization noise, but may be less accurate

2.1.20. Contour weight

The contour weight parameter determines the weighting of the contour filter. Negative values invert the frequency response of the filter. Zero is a flat filter.

2.1.21. Reference SPL

The reference SPL parameter determines the reference sound pressure level used for the contour filter. This is used to determine the amount of gain applied to the contour filter.

> Reference SPL is available for ISO-226:2003, ISO-226:2023, and Fletcher-Munson loudness contour types.

> See Contour for general calibration process

2.1.22. Output gain

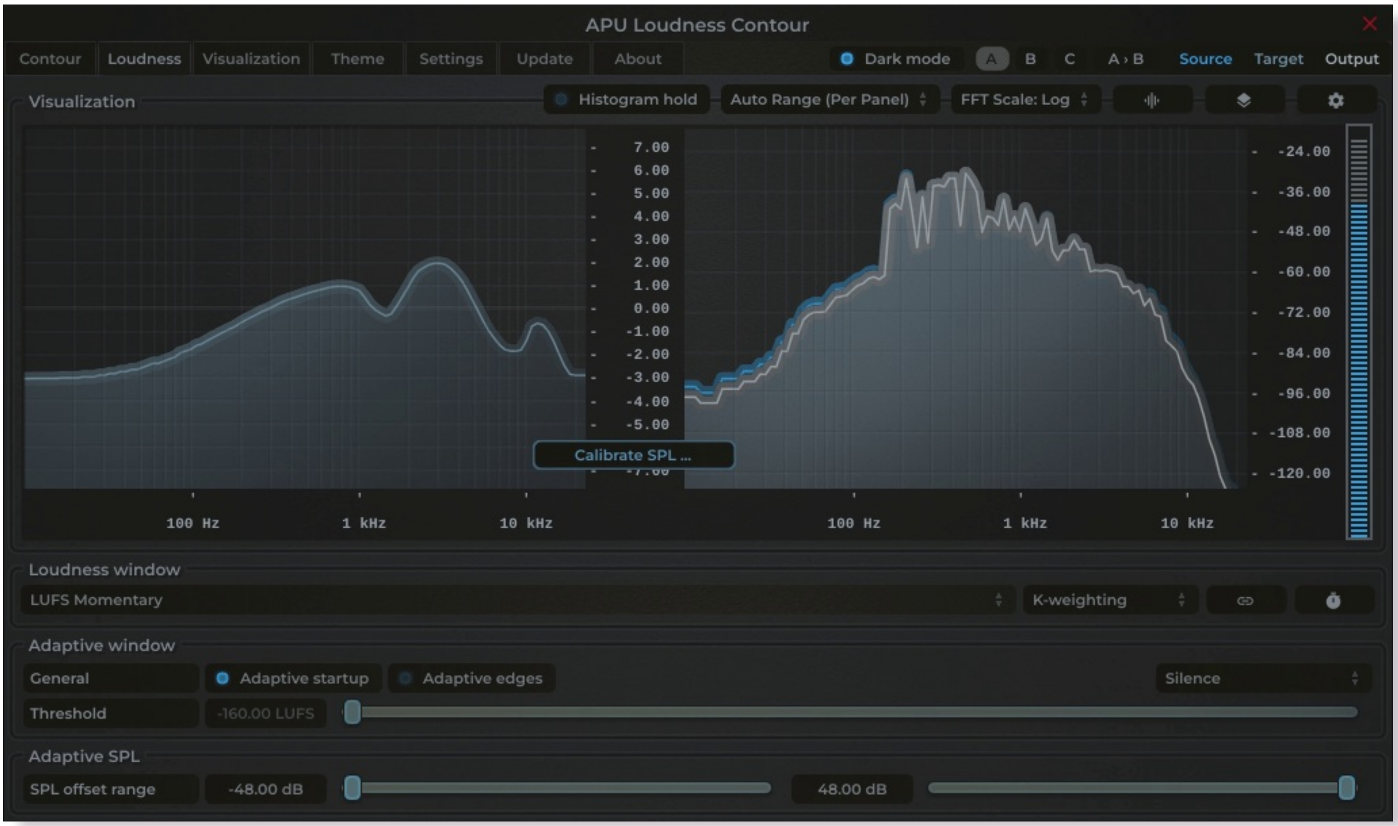
The output gain parameter allows you to apply additional gain to the output of the contour.

2.1.23. Attack/release (ms)

The attack and release parameters allow you to smooth changes made to gain and frequency parameters.

> Attack applies when a parameter is falling, while release applies when a parameter is rising.

2.2. Loudness



The loudness tab contains parameters relating to loudness measurements. You can configure adaptive window behavior here, which can be used to reduce transient artifacts during compression.

2.2.1. Loudness type

The loudness type combo-box and channel-link button allow you to configure the type of loudness measurement to use. Each loudness type supports channel-split or channel-linked processing. Channel-split treats each channel independently, while channel-linked integrates across all channels.

Three of the supported loudness types use a popular modern measurement standard for perceived loudness called LUFS. These loudness types are momentary (400ms window), short-term (3s window) and Integrated (infinite window).

There are also two peak loudness types (True Peak and Peak) as well as traditional RMS. True Peak is an improvement on peak which takes into consideration waveform behavior between samples, which allows it to properly respond to inter-sample peaks. Peak mode loudness types use a blocksize window.

> Integrated loudness type window can be reset by pressing the reset button.

2.2.2. IIR contour type

The IIR contour type combo-box allows you to change the LUFS loudness type's IIR filter contour. The following contours are supported:

- K-weighting
- ECMA-418
- ITU-R 468
- A-weighting
- C-weighting

> Contours other than K-weighting no longer conform to the LUFS standard, but are provided for flavor and perceptual precision.

2.2.3. RMS window

The RMS window parameter allows you to adjust the duration of the RMS window in milliseconds. Lower window durations respond more quickly to changes in loudness, while higher window durations provide a more stable loudness measurement. The RMS window is used by the RMS loudness type.

2.2.4. Momentary window

The momentary window parameter allows you to adjust the duration of the momentary window in milliseconds. Lower window durations respond more quickly to changes in loudness, while higher window durations provide a more stable loudness measurement. The momentary window is used by the Momentary loudness type.

2.2.5. Short-term window

The short-term window parameter allows you to adjust the duration of the short-term window in milliseconds. Lower window durations respond more quickly to changes in loudness, while higher window durations provide a more stable loudness measurement. The short-term window is used by the Short-term loudness type.

2.2.6. Adaptive startup

The adaptive startup parameter enables or disables adaptive startup behavior for loudness measurements. When enabled, the loudness window begins small and grows as the window fills. This can be useful for reducing transient artifacts at the start of playback.

2.2.7. Adaptive edges

The adaptive edges parameter enables or disables adaptive edge detection for loudness measurements. When enabled, loudness values crossing the configured adaptive threshold, or silence, will be detected and the loudness window will be reset. This causes the adaptive startup behavior to apply to every transition to/from silence. This can be useful for reducing transient artifacts during sudden changes in loudness.

2.2.8. Adaptive type

The adaptive type parameter allows adaptive startup and adaptive edges to be configured for Silence or adaptive threshold modes. Silence mode will only reset the loudness window when the input signal is silent. Adaptive threshold mode will reset the loudness window when the input signal crosses the configured adaptive threshold.

2.2.9. Adaptive threshold

The adaptive threshold parameter allows you to configure the threshold used by adaptive edges in adaptive threshold mode. This threshold is specified in the same units as the current loudness type.

2.2.10. Look-ahead

The look-ahead parameter allows you to configure how far in advance the loudness measurement looks for the source signal. This can be used to align Loudness Contour's response to account for the loudness window time and/or attack/release times, or simply as a creative effect.

Look-ahead requires that the look-ahead budget parameter is configured via the settings tab. This method of look-ahead configuration is used to support real-time adjustments of look-ahead without causing stuttering which would otherwise interfere with A/B testing.

> Note that look-ahead budget adds latency to the contour in order to function.

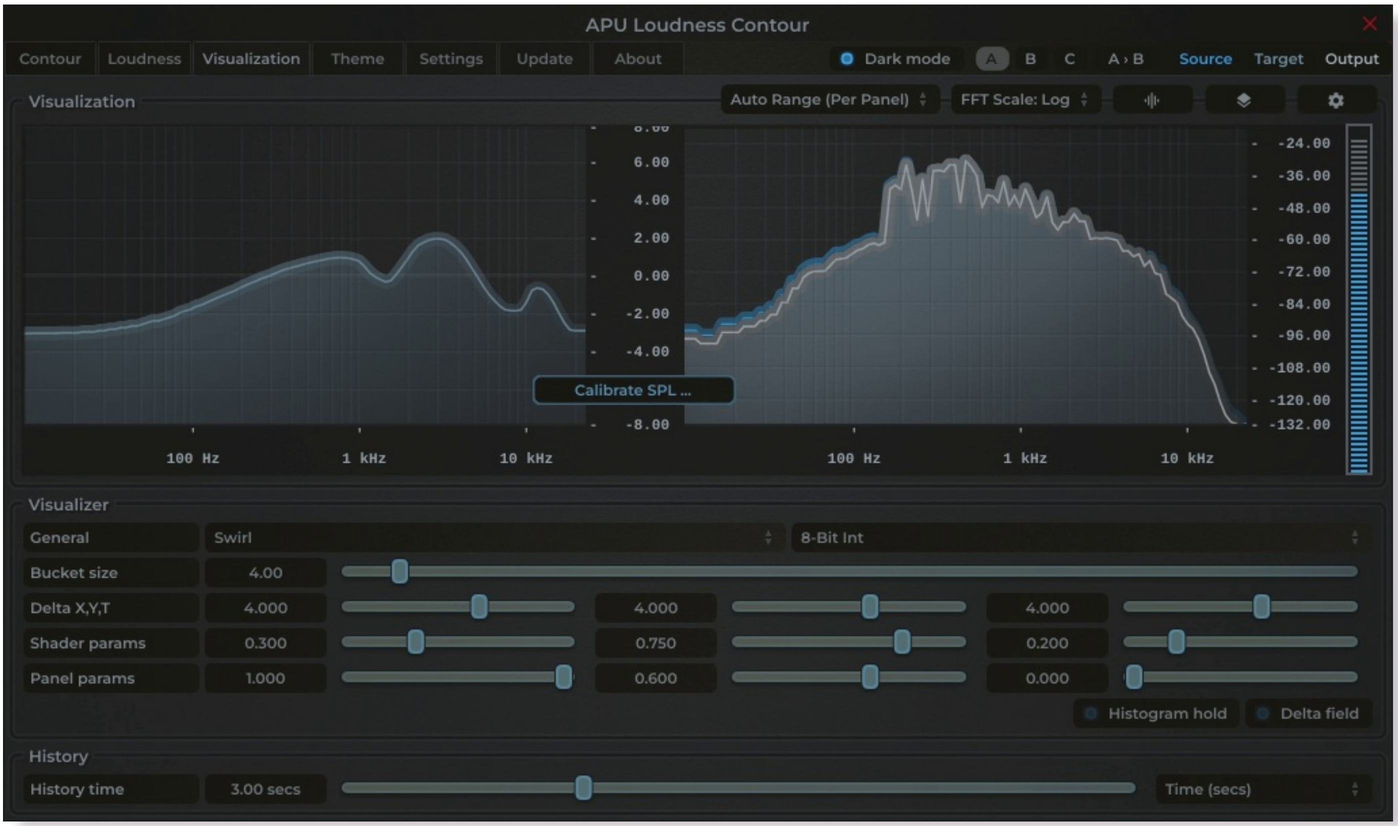
2.2.11. Reference Offset

The reference offset parameter determines the min/max offset applied to the reference SPL used for the contour filter for adaptive SPL.

> Reference Offset is available for ISO-226:2003, ISO-226:2023, and Fletcher-Munson loudness contour types.

> See Contour for general calibration process

2.3. Visualization



The visualization tab contains parameters related to real-time configuration of Loudness Contour's visualizations. This section describes these various settings.

2.3.1. Auto range

The auto range parameter enables or disables the visualization's auto range finding capabilities. This feature operates by analyzing the continuous histogram at each frame to determine a reasonable range for that moment in time. This range is then followed and adjusted smoothly over time.

2.3.2. Visual range presets

Visual range presets are provided for convenience to quickly adjust the dB range of the visualizer.

Currently, the following visual range presets are available:

- Auto Range (Global)
- Auto Range (Per Panel)
- Standard Reference (>= -90)
- Deep Range (>= -120)
- Full Range (>= -160)
- Custom Range ...

2.3.3. Loudness range

The loudness range parameter allows the visualization loudness range to be set manually. In order for this range to be enabled and used, the visual range presets parameter must be set to “Custom Range”

> See range sliders for information about range sliders in general.

2.3.4. Snapshots

The snapshots feature allows you to take a snapshot of the current histogram. This can be useful for comparing histograms.

Each source/target/output signal has its own snapshot. The snapshots are persisted with plug-in state, so they will be available when you reopen the project.

Snapshots can be operated using the popup menu or via keyboard shortcuts.

The following snapshot parameters are available:

- Save/clear snapshot (saves or clears the current histogram)
  - Source = Cmd + 1
  - Target = Cmd + 2
  - Output = Cmd + 3
- Fill snapshot (fills the area under the snapshot)
  - Source = Cmd + Alt + 1
  - Target = Cmd + Alt + 2
  - Output = Cmd + Alt + 3
- Show/hide snapshot (shows or hides the snapshot in the visualization)
  - Source = Cmd + Shift + 1
  - Target = Cmd + Shift + 2
  - Output = Cmd + Shift + 3

> On Windows, use Ctrl instead of Cmd.

2.3.5. Layout options

The options menu allows you to configure the layout of the visualization. The following options are available:

- layout source mode : Specifies the layout mode for the source signal.
- layout target mode : Specifies the layout mode for the target signal.
- layout output mode : Specifies the layout mode for the output signal.
- raster type : Specifies the type of raster visualization.
- raster orientation : Specifies the orientation of the raster visualization.
- show contour : Specifies whether or not to show the current contour for all panels
- show peak meter : Specifies whether or not to show peak meter.
- show axis labels : Specifies whether or not to show loudness axis labels.
- show axis lines : Specifies whether or not to show loudness axis lines.
- show alt axis labels : Specifies whether or not to show frequency axis labels.
- show alt axis lines : Specifies whether or not to show frequency axis lines.

> Each layout mode has an AUTO option which automatically selects the best layout mode based on the current context.

2.3.6. Layout source mode

The layout source mode parameter allows you to configure the layout of the visualization's source panel.

Currently, the following layout source modes are available:

- None (No source panel is displayed)
- Auto (Automatically selects the best layout mode based on the current context)
- Source only (Draws just the source signal)
- Source over Target (Draws the target signal first, then the source signal on top)
- Source over Output (Draws the output signal first, then the source signal on top)

2.3.7. Layout target mode

The layout target mode parameter allows you to configure the layout of the visualization's target panel.

Currently, the following layout target modes are available:

- None (No target panel is displayed)
- Auto (Automatically selects the best layout mode based on the current context)
- Target only (Draws just the target signal)
- Target over Source (Draws the source signal first, then the target signal on top)
- Target over Output (Draws the output signal first, then the target signal on top)

2.3.8. Layout output mode

The layout output mode parameter allows you to configure the layout of the visualization's output panel.

Currently, the following layout output modes are available:

- None (No output panel is displayed)
- Auto (Automatically selects the best layout mode based on the current context)
- Output only (Draws just the output signal)
- Output over Source (Draws the source signal first, then the output signal on top)
- Output over Target (Draws the target signal first, then the output signal on top)

2.3.9. Delta field type

The delta field type parameter allows you to specify the type of delta field used by the visualization.

The delta field is basically a mapping from each source pixel on the screen to a destination pixel. Pixel shaders are used to iteratively apply this delta field using interpolation and some light dithering effects. This feature is purely for aesthetic purposes and has no effect on the audio.

> Raster type effects are drawn into the delta field on each frame.

2.3.10. Bits per pixel

The bits-per-pixel parameter determines the number of bits per pixel to use when rendering visualizations. The default bpp is the best performing. You can increase bpp to improve visual quality.

2.3.11. Bucket size

The bucket size parameter determines the size in pixels of visualization buckets (rectangles).

2.3.12. Histogram hold

The histogram hold parameter enables or disables “hold” mode for the histogram raster types. While “hold” mode is enabled, the histogram will continuously accumulate measurements indefinitely. This can be used to capture a full duration view of your source audio. This allows you to easily adjust ranges to target to a specific region of the full dynamic range.

The histogram will still continuously accumulate measurements while “hold” mode is disabled, but for each new measurement the oldest measurement in history is replaced. This results in a continuously evolving histogram of duration specified by the history length parameter.

2.3.13. Delta X/Y/T

The delta X/Y/T parameters are provided to the visualization delta field in order to manipulate the delta field in real-time. The exact behavior of each parameter depends on the active delta field type.

2.3.14. Delta field

The delta field parameter allows you to enable or disable the visualization delta field.

The delta field is basically a mapping from each source pixel on the screen to a destination pixel. Pixel shaders are used to iteratively apply this delta field using interpolation and some light dithering effects. This feature is purely for aesthetic purposes and has no effect on the audio.

> Raster type effects are drawn into the delta field on each frame.

2.3.15. Shader params

The shader parameters control various aspects of visualization rendering. The following options are available:

- Shader param 1: Delta field fade rate. Lower values leave longer trails.
- Shader param 2: Curve fill transparency. Lower values make the curve more transparent, leaving only the edge(s) visible.
- Shader param 3: Curve edge thickness. Lower values make the edge thinner.

2.3.16. Show contour

The show contour parameter allows you to enable or disable contour drawing in the visualization.

> Show contour applies to all panels in the visualization, including source, target, and output signals.

2.3.17. Panel params

The panel parameters control various aspects of panel rendering. The following options are available:

- Panel param 1: Panel alpha (transparency), 0.0 to remove panel completely
- Panel param 2: Panel hue (rotates through normal, source, target, output).
- Panel param 3: Panel hue intensity

2.3.18. History length

The history length parameter allows you to change the duration of visualization history. This history is a rolling-window where each new loudness sample pushes out the oldest sample, maintaining a continuous history length with the duration you’ve configured here. Note that this setting applies both to history and histogram raster types.

> During histogram hold the histogram has an effectively infinite history length.

2.3.19. Show peak meter

The show peak meter parameter allows you to enable or disable peak meter drawing next to the visualizer.

2.3.20. Show axis labels

The show axis labels parameter allows you to enable or disable axis drawing in the visualization.

> The axis is scaled relative to the loudness range, which can be manual or auto range.

2.3.21. Show axis lines

The show axis lines parameter allows you to enable or disable axis line drawing in the visualization.

> axis lines are drawn at each Show axis labels.

2.3.22. Show alt axis labels

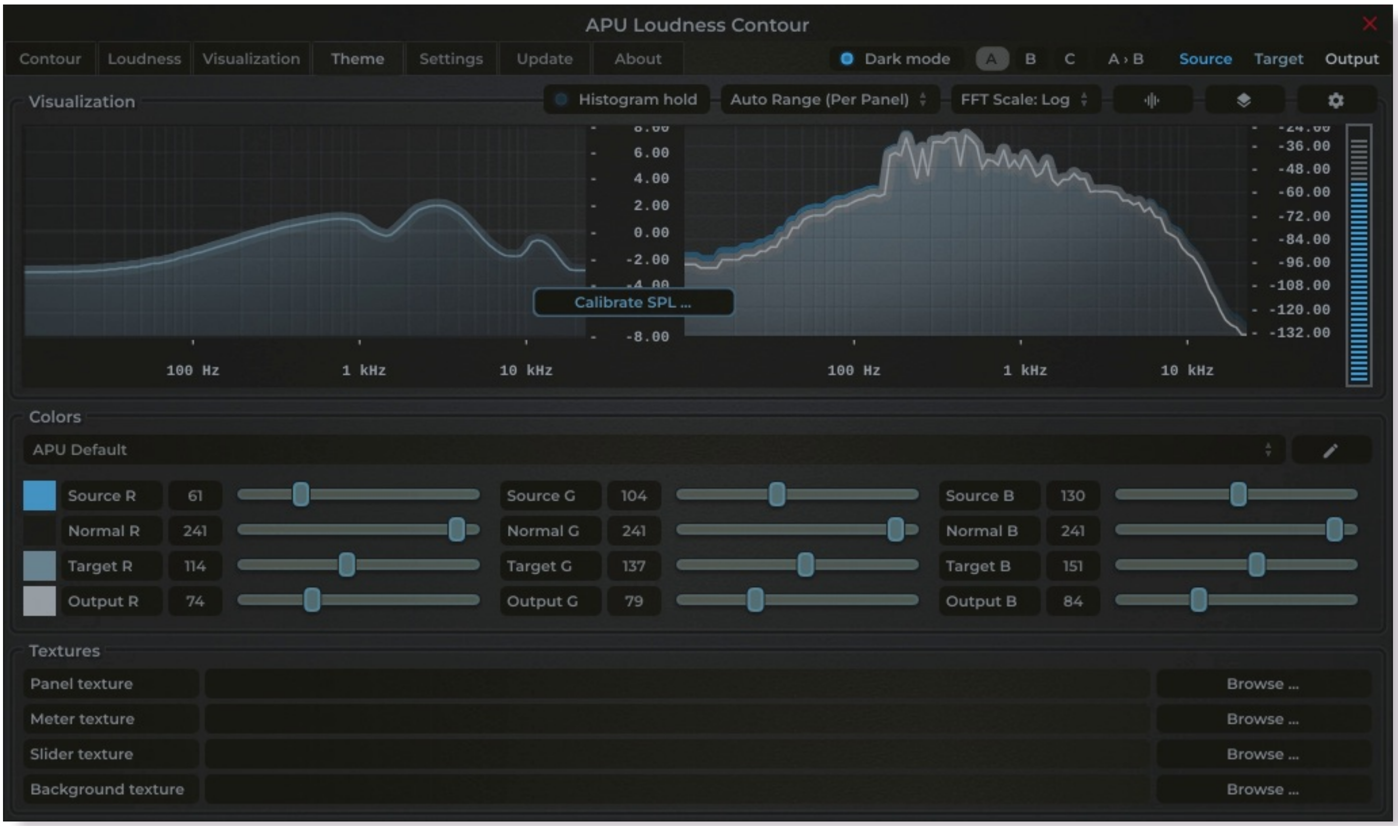
The show axis labels parameter allows you to enable or disable frequency axis drawing in the visualization.

2.3.23. Show alt axis lines

The show axis lines parameter allows you to enable or disable frequency axis line drawing in the visualization.

> axis lines are drawn at each Show alt axis labels.

2.4. Theme



The theme tab contains parameters related to color themes. Here you can select between the bank of color theme presets, or configure the individual colors yourself.

2.4.1. Theme presets

The theme presets combo-box allows you to switch between a variety of theme presets. Each theme has a light and dark variation. Switching between theme presets will load values into source color, normal color, target color and output color.

Currently, the following themes are available:

- APU Default
- APU Red
- APU Vermilion
- APU Orange
- APU Amber
- APU Yellow
- APU Lime
- APU Chartreuse
- APU Harlequin
- APU Green
- APU Erin
- APU Spring
- APU Aquamarine
- APU Cyan
- APU Turquoise
- APU Azure
- APU Cerulean
- APU Blue
- APU Indigo
- APU Violet
- APU Purple
- APU Magenta
- APU Raspberry
- APU Rose
- APU Crimson

2.4.2. Source color

The source color parameters control the red, green, and blue components of the source color.

The source color is used in a variety of contexts, from interactive widgets to visualization elements. This color signifies that an element relates to the source signal in some way. This color is expected to contrast against the normal color to some extent.

2.4.3. Normal color

The normal color parameters control the red, green, and blue components of the “normal” color.

The normal color is used in a variety of contexts, from interactive widgets to visualization elements. This color signifies that an element is essentially neutral, not related to source, target or output signal. This color is expected to contrast against the source color, target color, and output color to some degree.

2.4.4. Target color

The target color parameters control the red, green, and blue components of the target color.

The target color is used in a variety of contexts, from interactive widgets to visualization elements. This color signifies that an element relates to the target signal in some way. This color is expected to contrast against the normal color to some extent.

2.4.5. Output color

The output color parameters control the red, green, and blue components of the output color.

The output color is used in a variety of contexts, from interactive widgets to visualization elements. This color signifies that an element relates to the output signal in some way. This color is expected to contrast against the normal color to some extent.

2.4.6. Textures

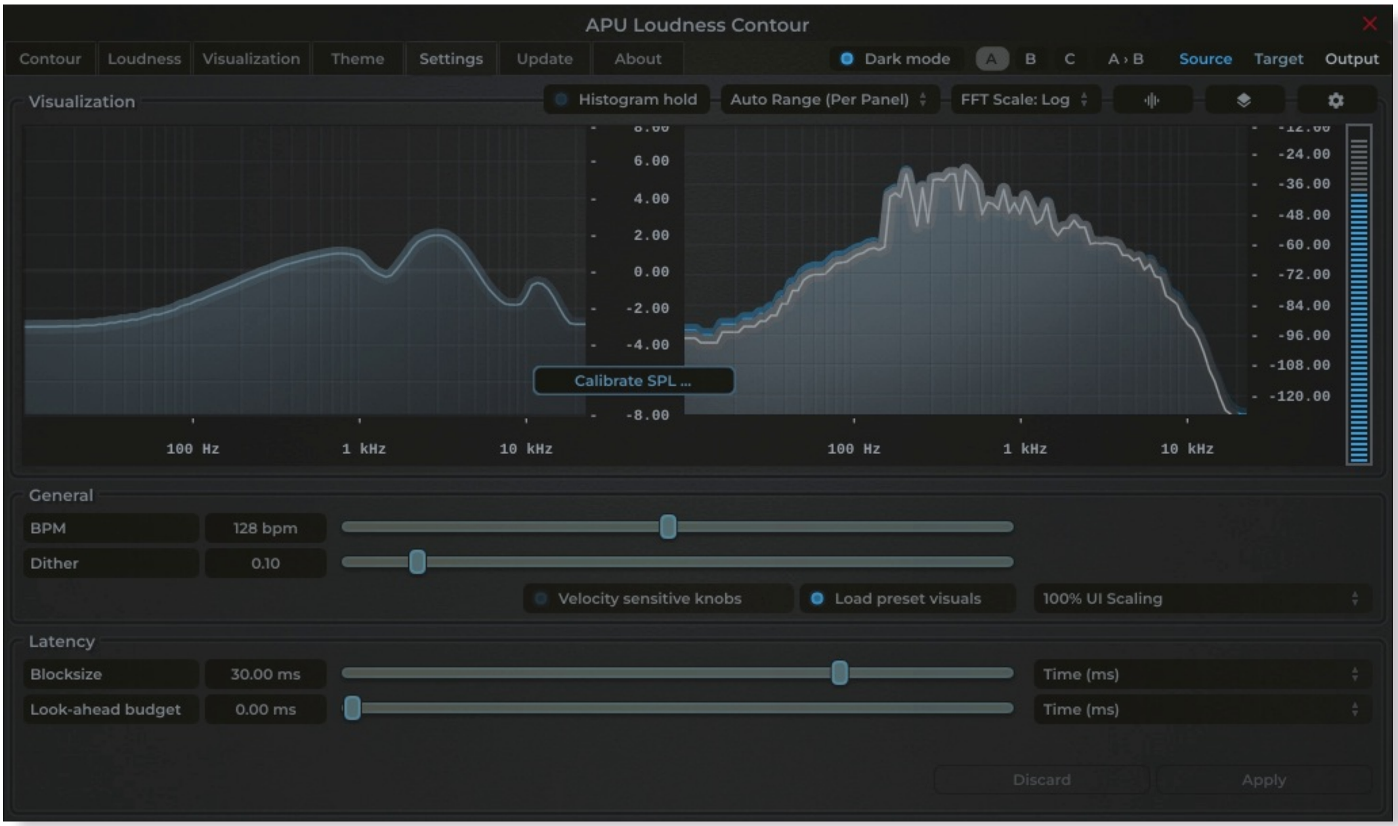
The textures configuration allows you to change the user interface textures.

The panel texture is used for the background of the user interface and has the shader params applied. The meter texture is used to fill the visualization effects. The background texture is used throughout the plug-in for shading.

These settings are stored with user scope, so you don't need to change them with every instance. Closing a texture will reverted to the default internal texture.

> Typically, the panel texture should be very dark and the meter texture should be very light.

2.5. Settings



The settings tab contains various additional parameters. These parameters are broken down between General and Latency parameters. Since Latency parameters impact delay compensation, changes to these parameters are deferred until you click the Apply button. It is generally not advisable to automate the parameters in the Latency section.

2.5.1. BPM

The bpm option allows you to set the BPM used by tempo-relative parameters.

2.5.2. Host BPM

The host bpm option enables usage of the host's BPM for tempo-relative parameters. When disabled, the bpm parameter is used instead.

> This parameter is not available (nor applicable) to the standalone application.

2.5.3. Dither

The dither parameter determines the strength of ballistics dithering. This parameter applies only to dithering ballistics type modes.

2.5.4. Velocity sensitive knobs

If enabled, this will turn on velocity-sensitive dragging, so that the faster the mouse moves, the bigger the movement to the knobs. This helps when making accurate small-scale adjustments.

> This parameter is saved at user scope, so it will be remembered between sessions.

2.5.5. Load preset visuals

The load preset visuals option allows you to enable/disable the loading of visualization and theme settings when loading presets. All other settings will still be loaded; this setting only has an impact on the visual appearance of the plug-in and does not impact the audio.

> This parameter is saved at user scope, so it will be remembered between sessions.

2.5.6. UI Scaling

The UI scaling option allows you to set the scaling of the user interface. This is useful for high-DPI displays, where the default scaling may be too small to read comfortably.

> This parameter is saved at user scope, so it will be remembered between sessions.

2.5.7. Dark mode

The dark mode toggle enables/disables dark mode. When enabled, theme colors have their brightness inverted.

2.5.8. Blocksize

The block size parameter determines the time frequency of FFT filtering. Generally speaking, lower block sizes will give more accurate results. However, lower block sizes also require more CPU resources, so it is necessary to find a balance. You can squeeze improved quality and/or performance by tuning this setting based on your available CPU resources.

> BPM units for block size are evaluated once at the time you press Apply.

2.5.9. Look-ahead budget

The look-ahead budget parameter determines the latency budget which is available for the look-ahead parameter. Once you have configured a look-ahead budget, you can adjust the look-ahead parameter in real-time within this range without introducing artifacts.

2.5.10. Delay compensation

The delay compensation parameter determines whether or not the plug-in will report latency to the host. Delay compensation is used by hosts to keep audio synchronized across channels.

> The delay compensation option is not available (nor applicable) to the standalone application.

2.6. Update

The update tab allows you to check for the latest product versions. Just click “Check for updates” to see the latest version numbers. If you’re not running the latest version, you can click “Download” to open the download page in your default browser.

2.7. About

The about tab contains basic information about the plug-in. This is also where you can activate or deactivate your product keys and check license status.

3. Glossary

This section defines some of the concepts used within the software.

3.1. Range sliders

Range sliders are used throughout the plug-in in order to specify the upper and lower boundaries of a range. These ranges can be controlled via mouse in various ways.

- Click and drag the lower thumb to adjust the minimum value.
- Click and drag the upper thumb to adjust the maximum value.
- Click and drag the region between slider thumbs to move both values. This allows you to adjust the average loudness without expanding/contracting the dynamic range.
- Ctrl + click and drag the region between slider thumbs to expand/contract range without changing the average (center) value. Drag the mouse up and down, left and right are ignored.
- Shift + click and drag the region between slider thumbs to combine both. Drag the mouse up and down to expand/contract range. Drag the mouse left and right to move both values.

3.2. Histogram

One of the primary views into your audio that this software provides is a real-time histogram. Histograms in general provide a quick and intuitive way to understand the relative frequency of different measurements. This is very useful when judging the overall dynamic range of the audio. The histogram provided by this software is capable of changing history length, bucket size and size continuously.

3.3. Source

The term “source” is used throughout the plug-in to identify the plug-in’s input source signal. This signal is represented in the user interface by the current theme’s source color.

3.4. Target

The term “target” is used throughout the plug-in to identify the configured target range loudness. This signal is represented in the user interface by the current theme’s target color.

3.5. Output

The term “output” is used throughout the plug-in to identify the output type signal. This signal is represented in the user interface by the current theme’s output color.

4. Credits

This software was developed by APU Software, LLC and is available as VST (windows x64/x86, macOS universal), Audio Unit (macOS universal), Pro Tools AAX (windows x64, macOS universal), or Standalone Application (windows x64/x86, macOS universal). The software libraries below are utilized for portions of the software:

- JUCE (cross-platform audio and user interface framework)
- Boost (header-only algorithms)
- melatonin_blur (blur effects)
- PFFFT (FFT library)

Demo video song credits:

- MVMT Music - Everyday Magic, licensed via ShutterStock

4.1. MIT License (libebur128)

4.2. MIT License (melatonin_blur)

4.3. FFTPACK License (pffft)

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