

Loudness Penalty 2

User Manual



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Welcome to Loudness Penalty

Thanks for choosing Loudness Penalty! This manual will get you up and running quickly, and will serve as a reference once you learn the basics.

System Requirements

- macOS 10.7 or greater
- Windows XP SP3 or greater
- AAX, Audio Unit, or VST 2.4 / 3 compatible DAW

Compatibility

- Mac: AAX (Pro Tools 11+), Audio Unit and VST 2.4 / 3 (all 64-bit)
- Win: AAX (Pro Tools 10.3.7+) and VST 2.4 / 3 (all 32 & 64-bit)

Installation and Authorization

To install Loudness Penalty on macOS, run the installer and follow the on-screen instructions.

Loudness Penalty will be installed into the following folders:

macOS

- AAX: /Library/Application Support/Avid/Audio/Plug-Ins/
- AU: /Library/Audio/Plug-Ins/Components/
- VST: /Library/Audio/Plug-Ins/VST/
- VST3: /Library/Audio/Plug-Ins/VST3/

Windows

- AAX: C:\Program Files\Common Files\Avid\Audio\Plug-Ins\
- VST: C:\Program Files\Steinberg\VSTPlugins\
- VST3: C:\Program Files\Common Files\VST3

Most DAWs will scan these folders for plugins. If yours doesn't, you may need to configure it to scan these folders. See your DAW's manual for more information.

Online Authorization (Requires Internet Connection)

When you first install and run Loudness Penalty, an authorization dialog will prompt you for your email address and serial number. Enter the email address that you used when you purchased Loudness Penalty. Note that both fields are case-sensitive.



Figure 1: Loudness Penalty Authorization

Offline Authorization

If you prefer, it is possible to authorize Loudness Penalty without an Internet connection. This approach may also be required if your DAW blocks keyboard input from plugins, preventing you from entering your email address and serial number. Visit the following URL for details:

<http://www.meterplugs.com/offline-authorization>

What's New in Loudness Penalty 2?

Loudness Penalty 2 adds the following new features:

- Block view for easily visualizing loudness metrics and normalization
- Spotify limiter preview and gain reduction indicator
- Fully resizable and responsive user interface
- New “mini” mode with a list view
- Lock button for “freezing” all measurements
- New Loudness Penalty scores for Spotify Loud, Quiet and YouTube Music

Detailed descriptions of these features can be found throughout this guide.

Introduction

In recent years all the major online streaming services have started regulating playback loudness. This means that loud songs will have their playback volume (or loudness) turned down, to prevent users from being “blasted” by sudden changes, and quieter songs *may* be turned up, depending on the service. The goal is to create a more consistent, enjoyable listening experience for users, especially in “shuffle” mode. This process is known as **loudness normalization**.

However, all the services achieve this goal in slightly different ways, which makes it challenging to understand and predict how your music will sound on each one. For example, you may be wondering how much your music’s loudness will be affected, and how it will differ depending on the streaming service.

The Loudness Penalty plugin has been developed to answer these questions, simply and easily, by giving you a precise estimate of the change in loudness you can expect when uploading your music to some of the most popular online streaming services.

You can also preview the final loudness of your song on each service, allowing you to compare it to similar reference tracks, and make optimal decisions for your music, balancing the artistic and technical aspects for maximum impact.

Getting Started

Using Loudness Penalty is straightforward. Simply insert the plugin in the final slot on the stereo output channel of your DAW, after all other processing, and press “play.”

The plugin will immediately begin to assess the loudness of your music and provide feedback about how it will be treated when it is played back on the most popular streaming services, including: YouTube, Spotify, TIDAL, Apple Music, Amazon Music, Pandora and Deezer. The results are displayed in decibels (dB) and indicate how much your music’s loudness will be reduced (or increased) by each service. We call these results the **Loudness Penalty scores**.

Loudness Penalty Scores

Suppose that your song has a Loudness Penalty score of -2 on YouTube. This means that its loudness will be reduced by 2 dB when it is played there. *(The adjustment is made at playback-time, in the player, and is not “baked in” to the uploaded file.)*

The Loudness Penalty scores update in realtime as audio is played through the plugin. To get an accurate reading for a particular song, you need to play it from beginning to end (or use “offline” processing, such as Pro Tools’ Audio Suite). To see a quick “worst case” estimate you can jump straight to the loudest moment in the audio.

It’s normal to see different scores for different streaming services. Additionally, the precise results of the normalization may vary depending on the settings a particular user has chosen in their player. See [Interpreting Loudness Penalty Scores](#) for details.

You’ll notice that as you increase the loudness of your music, the Loudness Penalty scores become more negative, indicating that your music will be turned down further.

Preview Mode

Loudness Penalty also lets you preview your music at the Distribution Loudness level of the streaming service that you have selected. This allows you to compare your music “live” against suitable reference material from each service, to make sure you’re happy with the way it

sounds. See [Preview](#) for details.

Suggested Loudness Penalty Score

By using the Loudness Penalty plugin you can know accurately, in advance, how the loudness of your music will be adjusted when it is played back online, and hear how it sounds. Knowledge is power, and equipped with this information, you'll be able to make the best possible technical and creative decisions to make your music sound exactly the way you would like it to, on all the online services.

As part of this guide, we'll discuss whether it makes sense to ask what the ideal "score" is for your music, and how to find it (see [The Ideal Loudness Penalty Score](#)). For now though, if you want to get straight to work, knowing that your music will incur a minimal "penalty" on all the major streaming services, we suggest adjusting its loudness (before the final limiter) so that the whole song has a Loudness Penalty score between 0 and -2 on YouTube, with peak levels not exceeding -1 dBTP.

User Interface

This section briefly describes the features of the Loudness Penalty plugin. To get the maximum benefit from using it, we also recommend that you read the sections that follow it, especially about interpreting and optimizing the results you get. The display and results are deceptively simple, whereas fully understanding and managing the Loudness Penalty score for your music is crucial for getting the most out of the plugin.

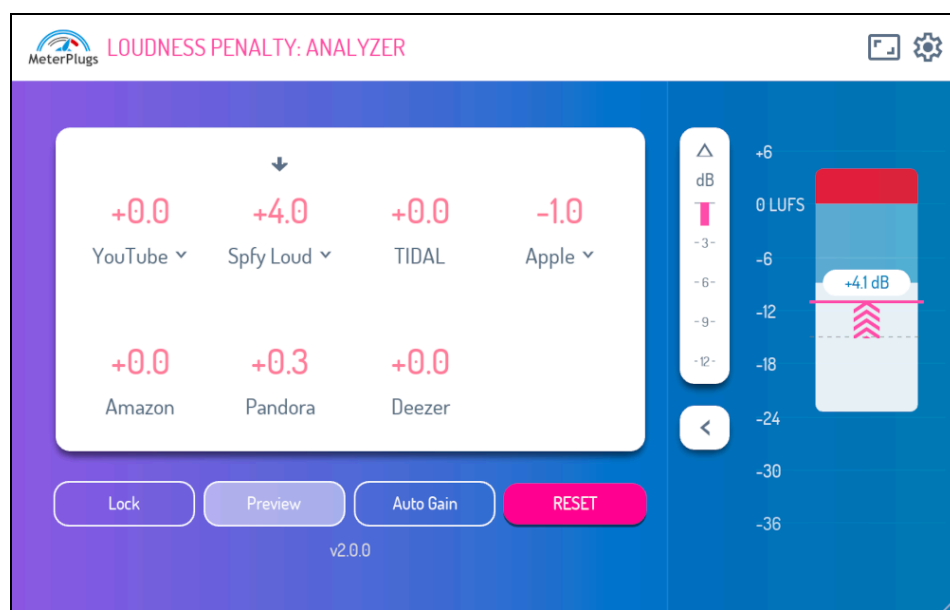


Figure 2: Loudness Penalty Plugin Interface

Loudness Penalty Scores

The main section of the plugin displays the Loudness Penalty scores (in dB) for YouTube, Spotify, TIDAL, Apple (and [Apple legacy](#)), Amazon Music, Pandora and Deezer. The scores are updated in realtime as audio is played through the plugin (see [Interpreting Loudness Penalty Scores](#)).

Clicking a Loudness Penalty score for a given service makes that service the **active** service for Preview mode and updates the preview gain when Preview mode is enabled (see [Preview](#)).

Hovering the cursor over a Loudness Penalty score reveals a tooltip with additional information

in certain situations. For example, if the loudness of your music can be increased without incurring a “penalty,” the tooltip will tell you by how much.

Several services, including YouTube, Spotify and Apple, have different modes. YouTube has two: Video (the default) and Music. Spotify has three: Quiet, Normal (the default) and Loud. Apple has two: Normal (the default) and Apple Legacy (SoundCheck). Click the chevron next to these services to open a dropdown that allows you to select the active mode.

Lock

Clicking the Lock button freezes all measurements: integrated loudness, max true peak, loudness range, etc., which stops the Loudness Penalty scores and Block View from updating. This is useful if you’ve measured an entire song and then want to preview sections of the song without the scores continuing to update.

Preview

Toggle this button to enable / disable Preview mode. When Preview mode is enabled, the plugin will adjust its output gain to match the active service’s Loudness Penalty score. The active service is indicated by an arrow above the Loudness Penalty score and can be changed by clicking on a different Loudness Penalty score.

For example, if YouTube is the active service and its Loudness Penalty score is -2.4, the plugin’s output gain will be reduced by 2.4 dB. This feature allows the loudness of your material to be compared “live” to the output of a streaming service in a browser or player app.

When using the plugin in this way it’s important to ensure that both your DAW and the streaming service player / app (e.g., the YouTube player) are operating at unity gain. For example, the Loudness Penalty preview assumes that the apps / players for YouTube, Spotify, TIDAL, etc., are set to full volume. The Pandora and Deezer web players in particular default to a lower volume, so you’ll need to set them to maximum for comparison purposes. You also need to ensure unity gain from the output of your DAW. If you are using an external sound card, it’s probably easiest to set your streaming players to use this audio output.

By default, the preview loudness does not update along with the Loudness Penalty score (see

[Auto Gain](#)). This means that over time, the preview loudness might diverge from the Loudness Penalty score of the active service. When the two numbers diverge by more than 0.3 dB, the Loudness Penalty score turns orange, indicating that you might want to “refresh” the preview loudness. Simply click the Loudness Penalty score again to update the preview loudness.

Disabling Preview mode returns the output gain to unity (i.e., the plugin makes no changes to the audio’s loudness).

[Auto Gain](#)

With this option enabled, the plugin automatically adjusts the preview loudness as the active Loudness Penalty score changes. This means the final loudness you hear always matches the streaming service’s Distribution Loudness, without you needing to click the Loudness Penalty score to update it.

This is very handy, because you don’t need to click on the Loudness Penalty score to update the preview loudness, but the feature must be used with caution. If the Loudness Penalty scores haven’t yet “settled” and are changing rapidly, the preview loudness will also fluctuate rapidly, which doesn’t mimic how loudness normalization works in practice (i.e., with a constant gain offset). For this reason, you should usually disable *Auto Gain* *until* the Loudness Penalty scores for your music have stabilized.

Be cautious enabling Preview mode when the current service is reporting a positive Loudness Penalty score as clipping could result. Loudness Penalty only applies limiting in the case of Spotify “Loud,” and only if the limiter emulation option is enabled.

[Reset](#)

Clicking the Reset button clears the Loudness Penalty scores, forcing the calculation to restart from scratch. Use the Reset button before measuring a whole song to get accurate scores for the entire song.

[Spotify Limiter Gain Reduction Indicator](#)

To the right of the Loudness Penalty scores, this gain reduction indicator is only visible when Preview mode is enabled and Spotify “Loud” is the active service. It displays the current gain

reduction being applied by the Spotify limiter emulation.

Listen to Difference Δ

Clicking the Listen to Difference (Δ) toggle swaps the Preview mode output from the limited signal to the “difference” signal (i.e., what the limiter is removing). Like the Spotify Limiter Gain Reduction Indicator, this button is only visible when Preview mode is enabled and Spotify “Loud” is the active service.

Block View

The Block View displays several loudness metrics on a single view:

1. **Max true peak** - indicated by the top of the block
2. **Integrated loudness** - the horizontal pink line
3. **Loudness range (LRA)** - the solid white section of the block
4. **Peak to loudness ratio (PLR)** - The difference between the top of the block and the horizontal pink line

When Preview mode is off, these are the original values prior to any normalization. When Preview mode is on, the Block View shifts to show the values after normalization, with pink chevrons depicting the gain change.

Click and drag the Block View to adjust the scale.

Options

Clicking the gear icon in the top-right corner of the plugin opens the Options panel, with the following options:

1. **Use host transport** - when enabled, the plugin will only process audio when the host transport is playing, even if the host feeds it silence at other times
2. **Emulate Spotify limiter** - when enabled, emulates the Spotify limiter in Spotify’s “Loud” mode

Plugin Size

Clicking the resize icon (next to the gear icon) displays a dropdown list of preset plugin sizes.

The plugin can also be resized by clicking and dragging its bottom-right corner but the preset sizes provide a quick way to jump between “mini” and “enlarged” views.

Output Gain Warning

If any operation (e.g., enabling / disabling Preview mode, selecting a new active service or resetting the plugin) will result in an increase to the output gain of more than 6 dB, a warning will be displayed. You can choose to accept the gain change or cancel.

Interpreting Loudness Penalty Scores

A Loudness Penalty score is a deceptively simple measurement. In this section we'll start with a high level overview of what a Loudness Penalty score is, and then dive into some of the nuances. By the end, you should have a clear and detailed understanding of how to interpret Loudness Penalty scores, and how they can help you achieve great results when streaming your music online.

At a high level, a Loudness Penalty score tells you how much your music's loudness will be adjusted when played back on a given streaming service. The score is given in dBs, relative to the music's original loudness. In other words, it represents the change in loudness that a streaming service applies. For example, a Loudness Penalty score of -2 for YouTube indicates that the music will be turned down by 2 dB when played back there.

Negative Loudness Penalty Scores

If your music has a negative Loudness Penalty score, it will be turned down, but that does not mean that it will be played back quieter than other songs! Rather, it should be played back at the *same* loudness level as other music, with the exception of very quiet music (more on this later). Indeed, this is the goal of loudness normalization: to eliminate sudden jumps in loudness between songs.

For example, a song with a Loudness Penalty score of -2 will play back at the same loudness level as a song with a Loudness Penalty score of -4. The latter just needs to be turned down more because it is louder. But the obvious question is then: if it's going to be turned down anyway, why bother turning it *up* in the first place?

This is a great question! Achieving very high loudness can be difficult, and sometimes has a negative impact on sound quality since it's often necessary to use heavy limiting or clipping. By targeting lower loudness levels, you can reduce the amount of processing needed, which causes less distortion and often allows you to achieve more space, depth and clarity in the sound while maintaining the same final playback loudness.

Finally, note that when your music is turned down by a streaming service, a simple, constant gain adjustment is used. No compression or limiting is applied to achieve the effect.

Positive Loudness Penalty Scores

Most modern, mainstream music genres are mastered very loud, resulting in negative Loudness Penalty scores, and they get turned down as a result. But some material will result in a positive Loudness Penalty score. In this case (you guessed it!) the music *won't* be turned down, and may be turned *up* by some services (see [How Streaming Services Increase Playback Loudness](#)).

If your music has a positive Loudness Penalty score, you might decide to master it louder, without having to worry that it will be turned down after uploading. For example, if your music has a Loudness Penalty of +2 on a particular service, you could safely increase the loudness by up to 2 dB without triggering any level reduction.

Remember to consider the context, though. Research shows that 80% of listeners think that an acoustic ballad shouldn't sound as loud as a full-tilt rock song, even when listening in "shuffle" mode. Just because the Loudness Penalty score tells you it's *safe* to increase the loudness of your music, that doesn't mean you necessarily *should*.

How Streaming Services Increase Playback Loudness

It turns out that raising playback loudness is not quite as straightforward as lowering it, due to the risk of exceeding 0 dBFS and introducing clipping. Because of this, there is more variation in how each service handles loudness increases.

YouTube, TIDAL, Amazon Music and **Deezer** don't turn quieter songs with a positive

Loudness Penalty score up. This means that your music may not sound as loud as other material, so you might want to consider increasing the loudness prior to uploading.

Apple tries to prevent level increases that might cause clipping. This means that in some cases, where the Loudness Penalty is positive, it won't be possible to increase the level enough to achieve equal perceived loudness with other songs.

Spotify has several different levels for loudness normalization: Quiet, Normal (the default) and Loud. Loudness Penalty supports all three modes. The Loud mode is intended for listening in noisy environments, has a Distribution Loudness that is 3 dB higher than Normal, and uses a limiter to prevent clipping for positive Loudness Penalty scores. The Normal and Quiet modes do not use a limiter, but instead restrict gain increases of quiet songs based on the song's true peak level. For example, a -16 LUFS song with a -2 dBTP level would be increased by 1 dB (in Normal mode) to a level of -15 LUFS and a true-peak of -1 dBTP.

It's not clear whether **Pandora** takes steps to prevent clipping or not. The Pandora web player's volume slider starts off 6 dB below the maximum possible level, so clipping is less likely unless the user also increases this, but we have seen occasional examples of clipping during our tests when running the player with the volume slider at the maximum.

For all services, the "safest" and most predictable method is to increase the loudness of your music until it no longer has a positive Loudness Penalty score. You can do this using custom dynamics processing and Loudness Penalty's Preview mode to ensure that you're entirely happy with the way your audio sounds.

Neutral Loudness Penalty Scores

A Loudness Penalty score of 0.0 indicates that the audio's loudness will not be adjusted. There are several possible reasons for this:

1. The audio already matches the Distribution Loudness of the service closely
2. The audio is lower than the Distribution Loudness, and the service in question doesn't increase playback gain (e.g., YouTube and TIDAL)
3. The service in question does increase playback gain, but only if peak levels remain

below a certain threshold (e.g., Spotify)

You can find out which of these options is the case by hovering the cursor over the Loudness Penalty score - a tooltip will give you more information.

In each case, the first step is to use Preview mode to compare your audio with a suitable reference track on the streaming service of your choice. If you're happy with the result, no further action is necessary; otherwise, you may want to adjust your processing.

Album vs. Track Normalization

There are two ways of applying loudness normalization: **track** normalization and **album** normalization. The names of the modes reflect the way normalization levels are applied.

In **track** mode, each audio file is normalized individually. The intention is to achieve more consistent results for "shuffle" playback and noisy listening environments, but in practice we've found it can sometimes sound strange. Songs intended to sound quiet are played at a similar level to songs that are meant to sound loud, which sounds unnatural in some cases. Track normalization also changes the song-to-song balance in albums, which can interfere with the intended artistic result. YouTube and Pandora only ever use track normalization.

In **album** mode, all the songs in an album are adjusted by the same amount, based on either an overall measurement, or the loudest song. This retains the artistic song-to-song loudness relationships in an album, which in our experience sounds more natural, even in shuffle playback. Both Spotify and Apple use album normalization when appropriate.

Because Loudness Penalty only measures individual songs, it doesn't predict the results of album mode. This is important to know, especially when assessing material for TIDAL. TIDAL *always* uses Album mode, even when playing single songs or in shuffle mode. This means that if you're uploading files as part of an album, you should measure all the loudest songs. The biggest (most negative) Loudness Penalty score will then be applied equally to all the songs on the album.

The Ideal Loudness Penalty Score

Some people say that the variation in Loudness Penalty scores between different services means we should create multiple masters, each optimized for a specific service. This is impractical though, since most aggregators only accept a single file and submit it to all services.

In fact, in our experience the idea of using a particular service's Distribution Loudness as a "target" is misguided. It doesn't make sense for an acoustic ballad and a heavy rock song to both be mastered at the same loudness, for example. Differences between songs are desirable to get the right musical and emotional impact, which is why album normalization works well.

This means the real challenge is to find a loudness for your audio that achieves a sound you're comfortable with across all the services. While it's not possible to find a "perfect" score for every service, in our experience it is possible to find a satisfying compromise that works well everywhere. The exact strategy you decide to use depends on your goals. In this section, we'll look at some examples.

Strategy 1: Maximum Loudness On All Services

To achieve maximum loudness on all services, you need to ensure your music matches the highest Distribution Loudness level of all services that don't turn quiet material up. At the time of writing, this means YouTube.

(There's no benefit in terms of loudness to going higher than this, since the level will simply be reduced. At the same time, if your music is substantially lower in level, it won't sound as loud as you might like.)

Other services will turn the music down further, because their Distribution Loudness levels are lower, but that's OK as they treat all their content in the same way. You'll leave a certain amount of peak headroom unused, but in mainstream genres that's not necessarily a cause for concern. Whereas if you optimize for a service with a lower Distribution Loudness, your music may not sound as loud as you would like on the louder services.

As a rule of thumb when aiming for the loudest playback, a small negative Loudness Penalty score on YouTube is OK. Large negative Loudness Penalty scores should still be avoided though, as songs like this can sound “smaller” than those with less negative Loudness Penalty scores, and will probably be turned down even further on other services.

Strategy 2: Streaming Quality and Musically Balanced Dynamics

If being as loud as anything else on the service isn't your main priority, we recommend you aim for the loudest song on the album to have a Loudness Penalty score of 0 on TIDAL.

TIDAL currently has the highest streaming quality of all the services supported by Loudness Penalty, and because it uses album normalization at all times (even in shuffle play), you can rely on it to maintain the intended musical balance between songs. By targeting a Loudness Penalty score of 0 for the loudest song on your album, you ensure that the loudest moments of your album balance with everything else on the service, and this will also be reflected on services which don't boost quieter songs (e.g., YouTube).

Strategy 3: Maximum Dynamics and Complete Musical Freedom

Ignore the Loudness Penalty score completely! This may sound silly, but it's a genuine suggestion. You just have to accept that your music's loudness may not be treated exactly as you would prefer on all the services. You can still use Loudness Penalty to preview what the practical effects will be for your music, and make some adjustments if you'd like, but you may find it works out fine to master your music exactly as you choose, with no consideration for streaming loudness.

Comparing the Streaming Services

This table summarizes the most important differences between each of the streaming services, plus some extra details we haven't discussed yet:

	Distribution Loudness in LUFS (approx.)	Normalization enabled by default?	Normalization type	Are quiet songs turned up?	Is limiting used?
YouTube	-14, -7	Mandatory	Track	No	No
Spotify	-14, -11, -19	Yes	Both	Yes	Both
TIDAL	-14	Yes	Album	No	No
Apple	-16	Yes	Both	Yes	No
Amazon	-14	Yes	Track	No	No
Pandora	-14	Mandatory	Track	Yes	No
Deezer	-15	Mandatory	Track	No	No

YouTube

Loudness Penalty calculates scores for both “regular” YouTube and YouTube Music. YouTube Music has a higher normalization level of -7 LUFS, the highest of all the services.

Spotify

Spotify has three user-selectable normalization levels: Loud, Normal and Quiet. Normal is the default mode, but Loudness Penalty allows you to see scores for and preview all three. The Loud normalization level is -11 LUFS while the Quiet level is -19 LUFS.

Spotify uses a limiter to prevent clipping when increasing the loudness of songs in Loud mode. It engages at -1 dBFS, with a 5 ms attack time and a 100 ms release time. In the Normal and Quiet modes, no limiter is used. Instead, Spotify caps the gain increase so that the song's maximum true peak level does not exceed -1 dBTP.

When Spotify “Loud” is selected and Preview mode is enabled, the Spotify Limiter Gain Reduction display becomes visible and shows how much limiting is being applied. It also allows you to preview the difference between the original and limited signals.

TIDAL

TIDAL always uses **album** normalization, which gives more satisfying musical results, even in shuffle. The loudness is decided using the loudest song on the album, so the largest, negative Loudness Penalty score will be applied to all the songs on the album.

Apple / Apple Legacy

Apple uses LUFS normalization in recent releases of iOS and macOS. Devices using older OS versions may still use the “Legacy” Sound Check values for normalization, which can often give very different results.

Deezer / Pandora

The default playback volume for both services is -6 dB, but Loudness Penalty scores are based on the volume slider being at maximum (i.e., 0 dB). So, to determine how loud a song will play back at the default playback volume, simply subtract 6 dB from the Loudness Penalty score.