

Ian Shepherd's
Perception AB
User Manual



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Welcome to Perception AB

Ian Shepherd's Perception AB by MeterPlugs allows you to make real-time, loudness-matched A/B comparisons of complex processing chains quickly and easily, with full latency compensation.

You can use it to compare the impact of effects including EQ, compression, limiting and more, without being deceived by differences in loudness. It reveals the impact your plugins have on your music's loudness and dynamics, and even allows you to bypass your entire mix!

In other words, Perception AB helps you make accurate, informed decisions about your music. It takes the “loudness deception” out of the equation so that you can focus on the sound of your music, rather than the volume. Welcome to the future of mixing and mastering!

System Requirements

- Mac OS X 10.7 or greater
- Windows XP, Vista, 7, 8 or 10
- AAX, Audio Unit, or VST 2.4 compatible DAW

Compatibility

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

Installation and Authorization

To install Perception AB on Mac OS X, run the installer and follow the on-screen instructions. Perception AB will be installed into the following folders:

Mac

- AAX: /Library/Application Support/Avid/Audio/Plug-Ins/

- AU: /Library/Audio/Plug-Ins/Components/
- VST: /Library/Audio/Plug-Ins/VST/

Windows

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

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 Perception AB, an authorization dialog will prompt you for your email address and serial number. Enter the email address that you used when you purchased Perception AB. Note that both fields are case-sensitive.



Figure 1: Perception AB Authorization

Offline Authorization

If you prefer, it is possible to authorize Perception AB 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:

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

Overview

The main purpose of Perception AB is to quickly and easily make loudness-matched comparisons for complex plugin chains, including EQ, compression, limiting and more.

When you first insert the plugin, you're prompted to select its mode: "Pre" or "Post". Place a Pre instance at the beginning of a processing chain you want to bypass and a Post instance at the end of the chain.

There are two types of Post instances: "Post Channel" and "Post Master". When *mixing*, multiple Post Channel instances are used on individual channels in your DAW, whereas when *mastering*, a single Post Master instance is typically placed at the end of the mastering chain. Both Post types are similar, but are optimized for the two scenarios and will be described separately.

Once configured, Perception AB allows you to switch seamlessly between the Pre and Post audio streams, effectively allowing you to instantly bypass an entire processing chain, including external analog hardware, with full sync compensation.

Bypassing processing chains in this way is useful, but where Perception AB really shines is by giving you the ability to perform loudness-matching. When you click Match Level, Perception AB will match the loudness of the Pre and Post audio. You are then able to toggle between the two streams to compare them at the same loudness. This lets you focus on the difference in the *sound* rather than the difference in loudness, a fundamental challenge that audio engineers deal with every day. (Perception was originally developed with mastering in mind, however it has been updated to be invaluable in mixing situations too.) Many plugins now include loudness-matched bypass functions, but Perception AB allows you to work with *any* plugin chain, including analog hardware.

Getting Started

Imagine that you want to test the result of your vocal processing chain. First, insert Perception AB *before* all the other processing on the vocal channel, and select the Pre mode. Second, insert Perception AB at the *end* of the processing chain, and this time select Post Channel mode. You can now toggle between the pre and post-processing vocal sound by clicking either the Pre or Post panes at the top of the plugin window.

Now, suppose that the chain includes a compressor which boosts the level of the vocal, in addition to influencing its dynamics. This can make it difficult to distinguish the change in gain from the change in sound. Perception AB solves this. Simply click the Match Level button. Now the Pre and Post audio streams will play back at the same loudness, meaning you'll *only* hear the changes in sound, without being deceived by the changes in loudness. You can clearly hear whether the processing has really made things sound better – or just louder.

And now imagine applying the same technique to multiple channels at once. Using Perception AB's Bypass All function, you can bypass *all* the vocal channels in the mix at once, or the whole rhythm section at once, with no change in loudness. You can even bypass the entire mix with a single click!

In a mastering situation, this allows you to objectively assess whether the processor you're using genuinely improves the way the master sounds, even without an increase in loudness. And in mixing, you can clearly hear the difference between the processing you've applied and a simple gain change, within the context of the entire mix.

This manual will describe the operation of the plugin and its interface, and after this various use-cases will be described, with suggested workflows for mixing, mastering, stem mastering and plugin testing.

Note: Perception AB is only meant to be used for previewing your audio using loudness-matching, not for processing your final audio. Once you've used Perception AB to optimize your processing choices, you should disable it for the final export.

User Interface

This section describes the Perception AB user interface components, which are identified by numbered circles, 1 through 11, in Figure 2.

(Note that component 8, Bypass All, is missing from the user interface shown in Figure 2. Bypass All is available in Post Channel instances, below the Sync button)

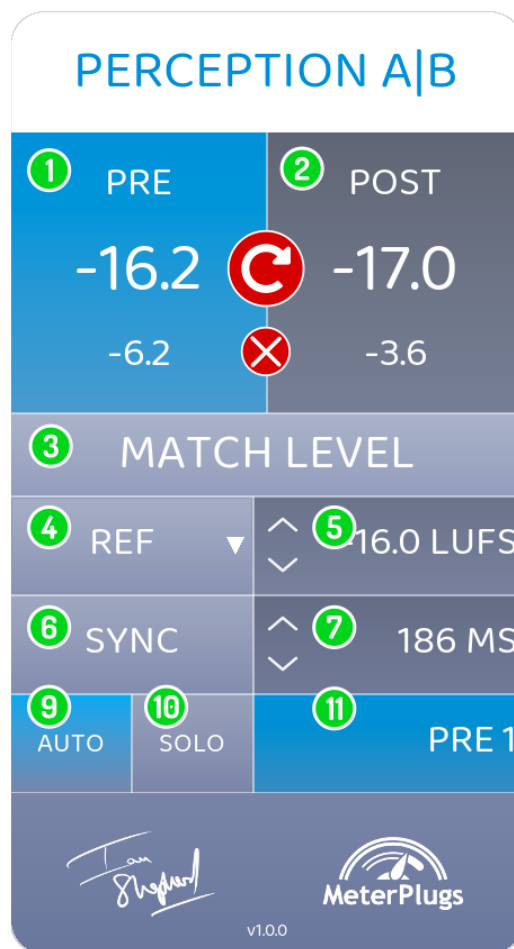


Figure 2: Perception AB User Interface

1. Pre Pane

Displays the level-matched loudness of the audio coming from the Pre instance (in LUFS), in large print. Below this is the current offset between the original Pre loudness and the loudness-matched value. Clicking on the pane toggles between monitoring the Pre and Post audio.

2. Post Pane

Displays the level-matched loudness of the audio at the Post instance (in LUFS), in large print. Below this is the current offset between the original Post loudness and the loudness-matched value. Clicking on the pane toggles between monitoring the Pre and Post audio.

For example, if the Reference Loudness has been set to -16 LUFS and the measured Pre loudness is -18 LUFS, when matched the offset would be +2 LU. If the Post loudness is -14 LUFS, the offset would be -2 LU.

3. Match Level

Matches the loudness of the Pre and Post instances (ie. the pre and post-processing audio streams). When the Match Level button is clicked, the LUFS indicators for the Pre and Post panes will update accordingly. You should re-match whenever the two values are more than 0.5 LU apart. This button will be temporarily disabled until an accurate loudness reading for each stream has been measured, which typically takes a few seconds. Click the Reset Loudness button (circular arrow icon) to reset the loudness calculation, and the Reset Gain button (cross icon) to reset the gain offsets.

If Perception AB has to change the Post loudness to achieve the match, you'll notice this loudness change and may wish to adjust your monitor gain. You can select which loudness the Pre and Post are matched to by using the Loudness Reference Mode drop-down menu (4).

4. Loudness Reference Mode

Use this menu to select how the Pre and Post loudness are matched. There are three options:

1. **Pre:** The Post loudness will be matched to the current Pre loudness. This mode is unlikely to cause clipping.

2. **Post:** The Pre loudness will be matched to the current Post loudness. This is the most useful mode in mixing and is the default setting for a Post Channel instance. Matching using this method will not affect the current post-processing monitoring gain, but often involves large increases in Pre loudness, which may cause clipping.
3. **Ref:** Pre and Post loudness will be matched to a reference loudness level of your choice. By default this value is -16 LUFS, but you can adjust it manually (see 5. Current Matched Loudness). Matching using this method will almost always involve a change in the monitored loudness (often a reduction) so you may wish to adjust your monitor gain. This option helps avoid large increases to the Pre loudness which might otherwise result in clipping, and can be helpful when dealing with a known Distribution Loudness, for example with online streaming platforms.

5. Current Matched Loudness

Displays the current loudness being used to match the Pre and Post audio streams. In Ref mode, the display shows the loudness you have selected, and you can adjust the value. In Pre and Post modes, the display will only show a value when you click Match Level. Comparing this value with the Pre and Post loudness values above (1 and 2) will help you decide when it's necessary to click Match Level again.

6. Sync

Calculates the overall latency (delay) between the Pre and Post instances. Use this option if you hear a click or stutter when switching between monitoring the Pre and Post audio. The audio being monitored will mute while the Sync is being calculated, which can take several seconds. If the latency between the Pre and Post instances changes for some reason, you will need to re-sync by clicking Sync again. For example, if you add or remove plugins between a Pre and Post instance, the plugin delay might be affected.

7. Sync Time

Displays the current latency compensation value, in milliseconds. This value can also be adjusted by hand, which may be necessary if a plugin interferes with Perception AB's sync detection (e.g., Wavelab's MasterRig). Wavelab and many other DAWs report the latency of plugins, making it straightforward to enter the correct value.

8. Bypass All

This button is only present in a Post Channel instance. When selected, it enables Pre monitoring for all active instances, effectively bypassing any group of channels where Pre/Post pairs are inserted. This can be useful if you have been assessing the bass, guitar and drum channels for example, and want to quickly hear the overall effect of processing on all those channels simultaneously. If you have Perception AB on every channel, it enables you to bypass (and loudness match) the processing of an entire mix.

9. Auto

This button is only present in a Post Master instance. When enabled, the Auto function will attempt to switch to whichever Pre instance is currently playing, and apply the correct loudness matching and sync values to it. This can be used when skipping rapidly between different “staggered” clips in a mastering timeline, or to and from reference tracks.

10. Solo

This button is only present in a Post Master instance. When enabled, all Pre instances except the Active Pre Instance (11) will be muted. This allows you to switch seamlessly between alternative “stacked” masters.

11. Active Pre Instance

Displays the Pre instance that the Post instance is currently “listening” to. When Auto (9) is enabled this value will change automatically (see above). When Solo (10) is enabled or in a Post Channel instance when mixing, the value can be adjusted as required using the arrow icons.

Mixing Workflow

Setting up Perception AB in a mix is simple:

- Insert Perception AB at the start of a mixer channel's processing chain and select Pre.
- Insert Perception AB again at the end of the same channel's processing chain and select Post Channel.

(It's also possible to add Perception AB to multiple channels simultaneously for more flexibility in large mixes – see *Bulk Insertion* below.)

You can now switch between the Pre and Post audio streams for this channel, and use the Match Level button to avoid being misled by differences in loudness.

As soon as you add a new Post Channel instance, it will automatically find a suitable Pre instance to pair with, but you can also edit the Active Pre Instance by hand.

The latency of each pair is calculated automatically, meaning you will only need to click Sync if you add or remove processing that changes this value, for example by adding or removing a plugin which causes latency. In most DAWs this auto-sync takes place when you start playback, but in some cases it will happen as soon as you add the instance, for example in Pro Tools and PreSonus StudioOne. The Post instance will mute playback during syncing, which will result in some channels dropping out of the mix until it is complete.

After playing audio for a few seconds you can click the Match Level button and compare the Pre/Post audio, loudness-matched, within the context of the rest of your mix. You can also add Pre/Post Channel pairs to any other channel in the mix that you want to check, and toggle each of them individually, or you can switch all of them to Pre simultaneously with a single click of the Bypass All button.

For example, you might start by adding a Pre instance to the first insert slot in the processing chain of the guitar channel in your mix. Next, add a Post Channel instance at the end of the

chain on the same channel. The new Pre and Post instances will pair themselves automatically, and you can then click Match Level and compare them as you like by toggling between Pre or Post in the Post Channel window. If you add additional Pre/Post pairs, for example for the bass channel and drum bus, you can then level-match them and compare the Pre and Post audio individually, or click Bypass All to hear the overall effect of the changes to all these channels.

This effectively creates a Perception AB “sub-group” within your mix, enabled whenever you click Bypass All, allowing you to assess the benefits of processing on multiple channels at once, without being fooled by the “loudness deception,” within the context of the rest of the mix. So in the example above, you can make a loudness-matched, sync-compensated comparison for the whole rhythm section.

You can even bypass your entire mix with a single click, by adding Pre/Post pairs to every channel (see *Bulk Insertion* below).

Bulk Insertion

Being able to compare the Pre and Post audio on a single channel in a mix is helpful, but the real power of Perception AB in mixing comes from using the Bypass All function to bypass multiple channels at once. However, adding and configuring plugins to a large number of channels can easily become time-consuming.

Perception AB makes it easy to add Pre and Post instances “in bulk.” This is useful if you would like the option to bypass the entire mix at once, or quickly compare the Pre and Post audio of any channel in the mix, without having to add plugins to each one individually.

To achieve this, simply insert Perception AB on as many channels as you would like, and hold down the Shift key when selecting either Pre or Post Channel. The menu will display “PRE (ALL)” or “POST CHANNEL (ALL).” All unassigned instances will switch to either Pre or Post Channel mode. Pre instances will automatically assign themselves a number, and Post instances will look for suitable Pre instances to pair with.

Make sure you insert the Pre instances first. They need to be assigned and numbered before you bulk-insert Post Channel instances. You should always bulk-insert the same number of Pre

and Post instances to ensure consistent pairing. Any Post Channel instance that is bulk-inserted but can't find an available Pre instance to pair with will remain unassigned.

When inserting new instances in bulk in this way, Perception AB will do its best to link Pre/Post pairs in a logical and consistent way. In our tests this functionality is working well, but since the plugin has no way of knowing exactly which Pre and Post instances you wish to pair, you may need to edit some of the auto-assignments by hand.

Whether you choose to add instances to your mix on a per-channel basis or in bulk, you are likely to get the results you want most easily by being systematic and consistent. Always initiate the bulk insertion for both Pre and Post instances using the same mixer channel, and always add the Post instances immediately after setting up the Pre instances.

So for example, if you select 10 channels of your mix, and insert the first Pre instance on Channel 3, you should insert the first Post Channel instance also on Channel 3, immediately afterwards. This helps avoid possible confusion due to adding or removing channels, or moving them in the mixer between bulk insertions, for example.

Mastering Workflow

Whereas for mixing Perception AB needs to be able to compare Pre and Post audio for multiple mixer channels playing simultaneously within a single song, in a mastering session it's more usual to have multiple songs which only play one at a time and need to be compared to each other.

To make this as easy as possible, it is only necessary to have a single Post Master instance on the main DAW output of a mastering session, and Pre instances at the beginning of the processing chain for each song. The Post Master instance defaults to Auto mode, where it can detect which Pre instance is active (processing audio) and apply the correct level matching and sync values.

This makes it possible to skip quickly between different songs in the timeline for easy comparison. Alternatively you can use Solo mode to "stack" multiple songs or references in the

timeline, and switch seamlessly between them using the Active Pre Instance arrow icons.

To set up a mastering session:

- Insert a single Post Master instance on the main stereo output, at the end of the mastering chain.
- Insert Pre instances at the beginning of each song's processing chain. These instances can be added to the audio clips directly, if your DAW supports this. Or, if you have each song on its own mixer channel, you can add the Pre instance using a mixer insert as usual.

Post Master instances don't Sync automatically, but you can choose to detect and compensate for any processing delay at any time by clicking Sync. Once the initial Pre and Post loudness measurements are complete, the Match Level option becomes active.

Syncing

When toggling between the Pre and Post audio streams, you may encounter situations where they are out of sync. This is caused by latency, either from plugins, converters or both. Basically, certain processors delay the audio stream in order to look ahead at future samples. This makes comparing the Pre and Post audio more difficult, because it will stutter or jump when you switch from one to the other. For this reason Perception AB can detect and correct sync issues so that you can seamlessly compare the Pre and Post audio streams. Sync will also help compensate for D/A and A/D conversion delays if you are using external hardware.

When Sync is first clicked, Perception AB will detect and compensate for any delay between the Pre and Post instances. This may take several seconds. The maximum detectable compensation time is 3000 ms, but larger values can be entered by hand.

Post Channel instances detect latency automatically, since it's important not to have different delays on different channels in a mix. Some DAWs process audio continuously, in which case the sync calculation will take place immediately after you insert the plugin. Pro Tools and StudioOne are two examples. In other DAWs like Logic, this will happen when playback first

starts, after the Post instance is inserted.

While the delay is being calculated, the Post instance displays a message, and its audio output will mute. This may cause muting of some channels in the mix, but is normal and will only last a few seconds.

If the plugin delay changes, you will need to re-sync. The plugin delay may change if you add or remove plugins between Perception AB's Pre and Post instances. When this happens, re-sync by clicking the Sync button again.

Pre and Post Placement

You can put the Perception AB plugins anywhere you like in your signal path, but we recommend you start as follows:

Mixing

- Put Pre instances before any other insert on the mixer channel.
- Put Post Channel instances after all other inserts on the same channel.
- Make sure the Pre and Post instances have the same number. If you insert the Post Channel instance immediately after adding the Pre instance, this will happen automatically.

In this case you can toggle between the Pre and Post audio streams to compare the “before” (un-processed) audio with the “after” (processed) audio for any channel using its Post instance. Alternatively, you can switch all channels with a Pre/Post pair to the Pre audio stream using the Bypass All function. If every channel has a Pre/Post pair, this allows you to bypass the entire mix – and of course use Match Level to make level-matched comparisons.

Mastering

- Put Pre instances at the beginning of the processing chain for each song you want to test. This can be achieved either using an insert slot in the DAW mixer, or applied directly to the audio clip itself, if your DAW supports it.
- Put a single Post Master instance on your master output channel, *after* the final limiter.

This setup allows you to objectively compare your entire processing chain, including final limiting. Perception AB's Post Master instance has an Auto function enabled by default, which automatically detects whichever Pre instance is actively processing audio, and recalls the current matched levels and sync values.

This allows you to compare multiple clips easily by moving rapidly between them, including reference tracks (see *Reference Tracks* below). Alternatively you can use Solo mode to manually choose the Pre instance you want to listen to and compare at any given time. This is helpful when using "stacked" tracks, where you want to put different songs on multiple tracks for quick comparison. (If you're comparing alternate masters of the same song, they need to be time-aligned with each other for this to work.)

If you put Perception AB's Post instances *before* your loudness meters (e.g., Dynameter) you can see the effect that your processing is having when you toggle between the Pre and Post audio. If you put it *after* the meters, they won't react when you use Perception AB. Either method is fine, so use whichever feels most intuitive to you.

Note: When Auto is enabled, Post Master instances will "pass through" the audio if there are no Pre instances processing audio. With Solo enabled, if the currently selected Pre instance isn't passing audio, the output will be silent.

Stem Mastering / Stem Mixing

Perception AB can also be used for stem mastering. Stem mastering is an extension of the standard mastering technique of applying processing to stereo mix files, and instead uses multiple files, each containing specific elements of the mix. For example, separate stereo stems might be provided for drums, bass, guitars, keyboards and vocals.

This means there is likely to be processing active on both the individual stem channels in the mixer, and the stereo (master) output.

Stem mastering in this way gives the mastering engineer more flexibility and control, but also blurs the line between mixing and mastering. For this reason it is also often referred to as stem

mixing, and this is probably the most helpful way to consider it when setting up Perception AB.

We recommend the following workflow:

- Insert Pre instances on each “stem” channel in the mixer, at the beginning of the processing chain, as you would for a normal mixing session.
- Insert Post Channel instances at the end of each stem channel’s processing chain.

You can now use Match Level and toggle Pre/Post as usual for individual stem channels, or Bypass All to hear how your processing is affecting them all at once.

On the master stereo output, you should add another Pre instance and a Post Channel instance at the end of the mastering chain. This will allow you to switch between Pre and Post for the mastering processing only, or bypass all the processing, for both stems and the stereo bus simultaneously.

(You could use a Post Master instance for the mastering processing instead, if you prefer, but the Auto and Solo modes aren’t really useful when working with stems, and the Bypass All option won’t be available in the Post Master instance. You can still use Bypass All from any of the Post Channel instances as usual, though.)

Plugin Testing

Plugin presets can be fun and useful, and a great way to quickly choose a starting point for your processing choices. However, some are configured to increase the gain by default, and like any loudness increase, this can be confusing.

For example, if you are testing two EQ modules, and one raises the gain by half a dB, you might decide it sounds better than an alternative, even though they both have the same settings and sound identical apart from the small difference in loudness.

Perception AB can be used to defeat this form of loudness deception. Simply insert a Pre instance before the plugin being tested, and a Post instance afterward. You can now use the Match Level button and compare the different processors without being deceived by small

loudness differences.

In the same way, you might choose to use Perception AB to isolate only a certain segment of your processing chain.

Reference Material

One great thing about Perception AB is that it will loudness-match *any* audio, even when there is no extra processing, and no corresponding change in level between the Pre and Post instances.

This means you can quickly and easily compare the song you're working on with your favourite reference material, at matched loudness levels. Simply follow this procedure:

- Import your reference tracks into your DAW.
- If your DAW supports clip-based effects, put a Pre instance onto each song.
- If not, place each reference song on its own audio track, and a Pre instance on each corresponding mixer channel.
- Add a Post Master instance to your master output channel.
- Play each song in turn and when you have a stable loudness estimate, click Match Level.

Now when you play each reference song, its monitored loudness will be set to Perception AB's current reference level, and you can objectively compare them to your own material.

Note: This functionality is primarily intended for mastering. However you can also use the same strategy when mixing. Simply route your current mix to its own stereo bus, add a Pre instance to that bus, play the mix and click Match Level. Now you can compare your mix with the reference songs as above.

Reference Level Mode

Choosing Ref mode from the Reference Level Mode drop-down menu enables you to match the

loudness of both the Pre and Post audio to any LUFS level you choose. By default this value is set to -16 LUFS, which will often cause a drop in the level you hear. This may be fine for mastering, but is often undesirable if you're using Perception AB while mixing.

For this reason, Post mode is the default Reference Level mode for Post Channel instances. This mode changes the Pre loudness to match the current Post loudness, ensuring that you won't hear a change in the monitored loudness when you click Match Level. However, it might also result in a large loudness increase to the Pre audio, which could cause clipping. This is unlikely to be an issue when mixing, but is something to be aware of during mastering.

The Pre mode is provided for completeness - it changes the Post loudness to match the Pre loudness when you click Match Level, which ensures the plugin will never cause clipping.

To avoid confusion, we recommend you use a consistent Reference Level mode throughout a project. This usually means always using Post mode when mixing and either Post or Ref mode when mastering.

Monitoring Levels

To make a loudness-matched comparison using a specific reference level in Ref mode, Perception AB changes the level of the Pre and Post audio. For this reason, you will almost always hear the monitored loudness change when you click Match Level. This is normal, and means that while you have Perception enabled, you may wish to temporarily change the gain of your studio monitors, and then revert the gain when you aren't using it. The easiest way to do this is to adjust the volume knob for your monitors.

So, if you have a normal mastering reference level when you are working, you will need to choose a second "Perception level" when you are using the plugin. The good news is that the output Reference Loudness will always be the same (-16 LUFS, by default) so once you know what works, you can just mark the "Perception level" on your monitor volume control and always use the same setting.

One Project at a Time

Some DAWs allow multiple projects to be open at the same time, but Perception AB has no way of knowing which project a Pre or Post instance belongs to. This opens up the possibility that multiple Pre or Post instances might assign themselves the same number, or instances from one project might be paired with instances from another. This may result in unpredictable behaviour, so we recommend you don't use this approach when using Perception AB. For the most reliable, predictable behaviour, only open one project using Perception AB at a time.

Loudness and Dynamics

Loudness and dynamics are an important consideration when mastering. If the music is too dynamic your music will blast your ears one minute and then you'll be straining to hear it the next. Reduce the dynamics too much and your music will sound flat, lifeless and fatiguing. Perception AB lets you hear how your processing affects your music's dynamics. We believe there is a "sweet spot" for every piece of music, and Perception AB can help you find that point.

For more optional guidelines, see *Mastering Loudness Recommendations* below.

Mastering Loudness Recommendations

Perception AB doesn't try to tell you how loud to master your music. Instead, it gives you an objective way of finding the "loudness sweet spot" that suits your taste, and stands up well against your reference material.

However, if you would like some guidance, you may find the following suggestions useful:

- Avoid mastering with an integrated loudness level greater than -11 LUFS.
- Avoid mastering with a true-peak level greater than -1 dBTP.
- Avoid pushing the short-term peak to loudness ratio (PSR) below 8 as measured with our Dynameter plugin.
- Pay particular attention to Dynameter's PSR reading when comparing your music to

reference material. If the reference tracks regularly read less than PSR 6, we suggest you try to achieve a similar sound but with higher PSR levels (>8). Typically, pushing PSR below 8 has little real-world benefit and can have an adverse effect on your music.

iTunes Sound Check and iTunes Radio use a reference level of approximately -16 LUFS, meaning if you master following the above guidelines, there may be up to 5dB of peak headroom unused.

International broadcast guidelines use a reference level of -23 LUFS, leaving up to 12 dB of unused peak headroom following the guidelines above.