Ian Shepherd's Dynameter

User Manual

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Welcome to Dynameter

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

First of all, Dynameter is **not** a loudness meter.

Instead, as the name suggests, Dynameter measures how *dynamic* your music is, offering you a real-time snapshot of the dynamics of your music, beat by beat, or over a whole song or album.

That's because as time goes on, the *loudness* of a file is becoming less and less important. What matters instead is how dynamic it is, and how it is treated online as a result.

Now that loudness management (normalization) is commonplace in broadcast, radio and streaming services, it makes less sense to focus on maximizing your music's loudness. The loudness of your music (relative to other music) will now be determined by the broadcaster or online platform, *not* the levels in your files.

Instead, the challenge going forward is to achieve optimal dynamics. Excessive dynamics can make casual listening difficult, but insufficient dynamics sound flat and boring. Dynameter helps you target the ideal balance of dynamics for your style in a visual and intuitive way.

That's why the tagline for Dynameter is "Stop worrying about loudness, start succeeding with dynamics".

System Requirements

- Mac OS X 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 Dynameter on Mac OS X, run the installer and follow the on-screen instructions. Dynameter 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/
- 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 Dynameter, an authorization dialog will prompt you for your email address and serial number. Enter the email address that you used when you purchased Dynameter. Note that both fields are case-sensitive.

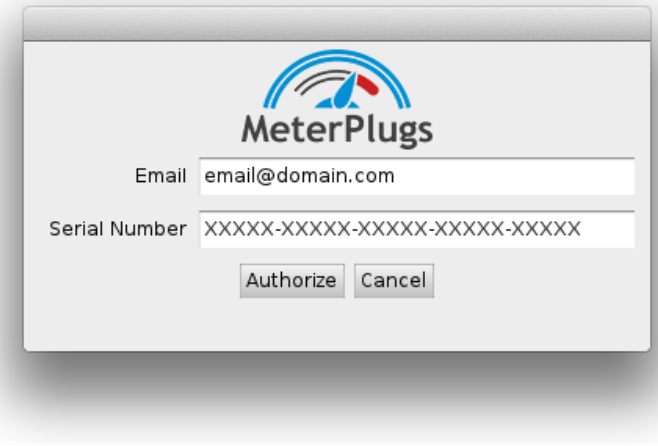


Figure 1: Dynameter Authorization

Offline Authorization

If you prefer, it is possible to authorize Dynameter 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

Getting Started

Dynameter displays two different measures of the dynamics of your music: the **PSR** (Peak to Short-term loudness Ratio) and **PLR** (Peak to Loudness Ratio) readings.

Both numbers represent **the difference between the peak and loudness** levels of your music, though over different time scales. PSR is a short-term, 3 second measurement while PLR can measure an entire song or album. You can use these values to optimize the musical impact of yours songs, and judge how they'll be treated online.

Getting started with Dynameter is simple. Just insert the plugin on the stereo output of your DAW and press Play! The PSR Bar will display the current PSR of your audio as the PSR History unfolds below it. The wider the bar or history value, the more dynamic the audio is likely to sound. The Minimum PSR and overall PLR readings are also displayed - see below for more details.

The PSR display is colour-coded. More dynamic material will show as green, blue and purple, whereas material with limited dynamics will be coloured yellow, orange or red. **We recommend you don't push your music below PSR 8 (red)**, and for this reason the meter displays darker, more muted colours for PSR values lower than this.

To zoom in or out of the PSR History, simply click and drag up or down. Zooming in shows more detailed information over short periods of time, whereas zooming out allows you to get an overview of longer periods of time (a whole song, or even a whole album). To adjust the horizontal scale, click and drag to the left or right while holding down the Shift key. The history can be cleared at any time by pressing Reset.

User Interface

This section briefly describes Dynameter's user interface elements.

Figure 2: Dynameter User Interface

Options Toggle

Show / hide the options panel.

Minimum PSR Target

Sets the PSR threshold that you wish to stay above. This threshold is depicted by the Target Guides in the PSR History.

Minimum PSR

A realtime, numeric display of the lowest PSR value since the last reset. Click to reset.

Numeric PLR

A realtime, numeric display of the PLR value since the last reset. Click to reset.

Platform PLR and Indicators

A realtime, graphical display of the streaming platform's PLR (see Platform PLR Presets) and the current PLR. The Platform PLR is indicated by yellow triangles above the scale while the current PLR is indicated by white triangles below the scale.

PSR Bar

A realtime, graphical display of the current PSR.

Pause on Silence

Stops the PSR History from updating when silence is detected (see Silence Threshold, next).

Silence Threshold

The LUFS level below which the signal is considered silent.

Use Host Transport

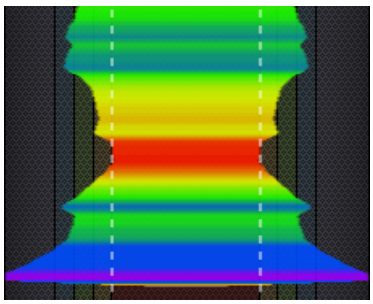
Start / stop the PSR History when the host transport is playing / paused. This may not work in all hosts. If it doesn't work in your host, try using Pause on Silence instead.

Reset on Play

Reset the PLR, Minimum PSR and PSR History displays when playback is resumed.

PSR History and Target Guides

A “waterfall” display of PSR values over time, with the most recent PSR values appearing at the top. Wide sections indicate greater dynamics than narrow sections. Similarly, sections coloured green, blue and purple have greater dynamics than sections coloured yellow, red or brown. The history can be scaled vertically by clicking and dragging. It can be scaled horizontally by shift-clicking and dragging.



Timecode

Displays the time (HH:MM:SS) at the mouse pointer’s position in the PSR History. When available, the host’s absolute timecode is displayed; otherwise, a relative timecode is shown.

History Reset

Clears the PSR History, Minimum PSR and PLR displays.

Preset and Platform Selectors

Click the left and right arrows to change presets and platforms. See Minimum PSR Presets and Platform PLR Presets.

Section 1: Optimizing Dynamics

Dynameter has two core uses: optimizing dynamics for maximum musical impact, and assessing the impact of dynamics for online loudness. This guide will explain these two uses in two separate sections, starting with optimizing dynamics.

PSR (Peak to Short-Term Loudness)

PSR is a measure of the peak-to-loudness ratio of your music, measured over a short time scale. It measures the detailed dynamics of your music and is sometimes referred to as the "crest factor". PSR often gives similar values to the TT Meter's "DR" values. See Appendix 1: Dynameter vs. TT Meter.

Dynameter displays PSR values in its PSR History, PSR Bar and Minimum PSR reading. You can choose a Minimum PSR Target, which adjusts the positions of the Target Guides in the PSR History. This gives you a visual reference to stay "above".

Interpreting PSR Values

We're so used to looking at peak-level waveforms, it can be tempting to interpret Dynameter's PSR History in the same way. But they are quite different. With a peak waveform, a "spiky" shape means the music is likely to be dynamic. With Dynameter, the width of the graph in the PSR History describes how *dynamic* it is, while the spikiness shows how much variety there is in the dynamics.

Low PSR readings (less than 8) often indicate excessive limiting or clipping. Consider adjusting your processing settings if you regularly see low PSR values with loud audio.

Some sounds naturally have low PSR values without any additional processing. For example: smooth, sustained sounds, "sine wave" bass sounds, solo flute or keyboard pads, and long-held sung notes. Synthetic sounds like virtual instruments, and audio from sample libraries may also have naturally low PSR readings.

If your music has "naturally" low PSR values without using compression or limiting, you don't

necessarily need to be concerned. However, check that no unwanted clipping is occurring, for example at an analog input, or in a fixed-point DSP host or plugin. This is especially true if you expected the sound to have a high PSR - for example drums or percussion.

By contrast, naturally dynamic sources like unprocessed acoustic drums and percussion will often give high PSR readings (greater than 12) unless the signal has been clipped in some way, intentionally or otherwise.

With these guidelines in mind, it's straightforward to interpret Dynameter's display when you see low PSR values:

- If the music **is** meant to sound loud but Dynameter shows lower PSR values than desired, we recommend you consider reducing the amount of limiting, compression or clipping you are using.
- If the music **is not** meant to sound loud and the PSR reading is low, the source material is probably naturally less dynamic.

Minimum PSR Presets

Dynameter includes several Minimum PSR presets to help you get started. Each preset corresponds to a different Minimum PSR Target. Alternatively, you can enter a custom value.

Preset	Minimum PSR Target
Limited	8
Competitive	10
Balanced	12
Wide	14

Aim to keep the typical PSR reading of your music outside the Target Guides in the PSR History.

If you are recording or mixing, you will probably find the **Wide** or **Balanced** presets most useful.

If your goal is to achieve the kind of dynamics we hear in many classic tracks from the 70s, 80s and 90s, the **Competitive** preset is a great place to start. Using this preset is also an excellent way to achieve contemporary dynamics without becoming a “casualty” of the so-called Loudness War.

The **Limited** preset reflects what we believe should be the Minimum PSR value when mastering, in any genre. If your music consistently measures less than PSR 8, there is increased risk that it will suffer from loss of punch, depth or impact, or even pumping and distortion. It will also be reduced in level by online streaming platforms like YouTube, Spotify, Tidal and iTunes SoundCheck. See Section 2: Optimizing for Online Loudness.

Minimum PSR Targets for Different Genres

We’re often asked how the Minimum PSR Target should vary between genres. For example, should EDM and metal be mastered with lower PSR? In our experience the answer is: no. **Once you find the Minimum PSR Target you’re comfortable with, it will apply in almost any genre you choose.** That’s not to say that the PSR Histories will look the same, however. Intense genres like EDM and metal will often show less *variation* in dynamics, with fewer high PSR readings, whereas jazz, folk and classical will show a wider range of PSR values, with fewer low readings. But the minimum values (at the loudest moments) remain similar.

PLR (Peak to Loudness Ratio)

PLR is a measure of the peak-to-loudness ratio of your music, measured over longer time-scales such as an entire song or album.

Higher PLR values suggest more dynamic music, and PLR values are typically several points higher than the typical PSR readings for a piece of music. Dynameter displays PLR as an overall value, and allows you to compare your music’s measured PLR with Platform PLR values for various online streaming platforms. See Interpreting PLR Values.

In Dynameter, the PLR Indicators denote the PLR of the audio since the last reset. This means you can measure a single PLR value for a song or section of audio. Simply click Reset and play through the full piece of audio you want to measure. At first the PLR will track the PSR reading quite quickly and closely, but before long it will slow down and "settle" on a value that represents

the entire piece of audio.

Interpreting PLR Values

It may seem tempting to view PLR as an indicator of overall dynamics, but that can be misleading. For example, the two songs in Figure 4 below both measure just over PLR 11, but have very different dynamic profiles:

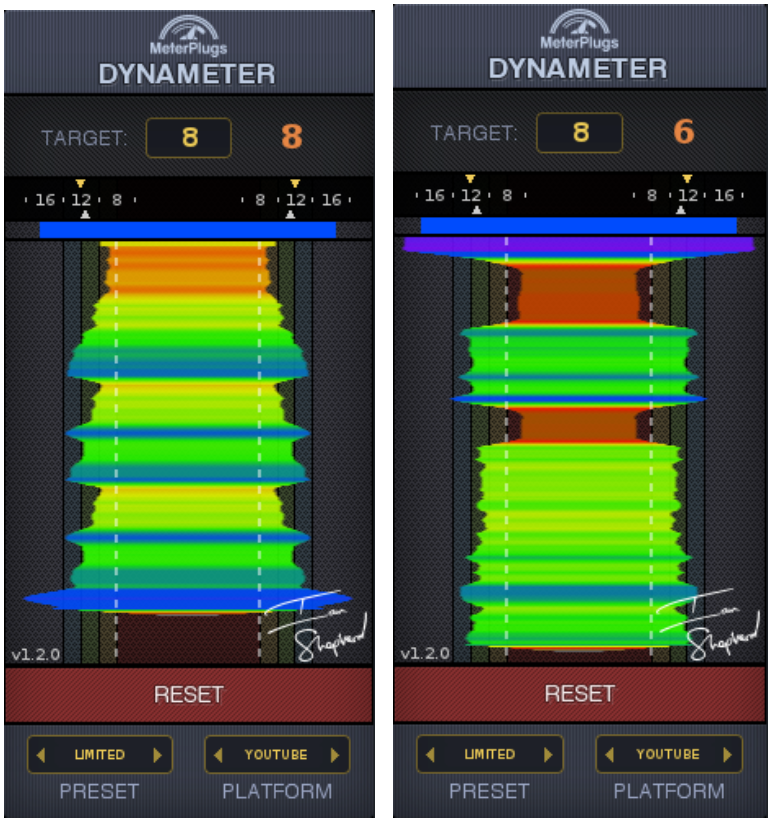


Figure 4: Two songs with similar PLR values but different dynamics profiles

The first song is generally quite dynamic, with a Minimum PSR of 8. The second includes two long sections with a very low PSR of 6, but you wouldn't know this by looking at the PLR measurement. For this reason, PLR values should be treated with caution, and are best judged in comparison to the music's typical PSR readings. See PSR vs. PLR.

PSR vs. PLR

Comparing PLR to PSR is a powerful way to assess dynamics. When the Minimum PSR and PLR readings are *similar*, it suggests there is little variety in the music's dynamics. If there is a

larger difference between PLR and PSR readings, there will be more variety of dynamics in the music.

Here are some common scenarios to illustrate this:

Low Minimum PSR, Low PLR

The low PSR reading suggests very limited dynamics, and since the PLR is similar, there is also very little variety. For example, a song that is a typical "victim" of the loudness war might measure Minimum PSR 6, PLR 8 or even lower. It's likely to have been heavily limited or clipped, with very restricted dynamics, and potential side effects like pumping or distortion.

Low Minimum PSR, High PLR

In this case the song is likely to contain more dynamic variety but some sections still have very limited dynamics and you might want to to process it less heavily to reduce any negative impact of this.

High Minimum PSR, High PLR

Healthy dynamics, although with limited variety. For example a classic "loud from start to finish" rock or pop song might have Minimum PSR 9, PLR 11. In our opinion this indicates healthy, competitive dynamics overall.

High Minimum PSR, Very High PLR

Healthy dynamics with lots of variety. However, higher PLR values can have implications for playback loudness on some platforms. See Section 2: Optimizing for Online Loudness.

Summary

In general, higher PLR and Minimum PSR readings suggest more dynamic material, but raw readings need to be interpreted with care. It's possible to have a song with short sections of very limited dynamics (low Minimum PSR) but for these to be "hidden" by a fairly high PLR reading. And, very brief low Minimum PSR readings can be found in even the most dynamic recordings - but this is not necessarily a problem.

Section 2: Optimizing for Online Loudness

The number-one source of user complaints on any platform is always excessive variations in loudness, so to create a better user experience online music platforms turn very loud songs down, and quieter material up, to create a more consistent, satisfying listening experience. This is known as loudness management, or "normalization".

Examples of platforms using loudness management include YouTube, Spotify, Pandora, and Apple Sound Check. More and more platforms are implementing similar systems as time goes on.

The process works fairly well on the whole, but it can be difficult to know how your music will be “judged” by online loudness management, especially since each platform measures loudness differently, and uses a different playback reference level.

One of the most helpful uses for Dynameter’s readings is to assess how online streaming platforms will adjust the playback loudness. This is especially important when optimizing the dynamics of music that you want to be played at as high a level as possible.

PSR and Online Loudness

To prevent loud songs “blasting” users, each platform has a maximum replay level, and won’t allow any music to play louder than this, regardless of the measurements of the original file. Pushing PSR values “beyond the red” in Dynameter to achieve “loudness” won’t work when loudness management is in use, and can result in limited dynamics that reduce musical impact or even cause distortion.

Low PSR readings are likely to cause your music to be turned down by online loudness management systems. As a rule of thumb, if the typical PSR reading of your music is less than 10, it will be turned down by **all** the online streaming platforms.

PLR and Online Loudness

It can be helpful to think of PLR as a measure of “loudness space”. This can be the loudness space *used* by a piece of audio, or the loudness space *available* on a particular playback system.

We have assessed the loudness space available on some of the most popular online streaming platforms and assigned each of them a corresponding “Platform PLR” value. Playback systems with higher Platform PLR ratings allow more flexibility when managing loudness. The higher the Platform PLR, the more loudness space is available when music is normalized.

If the PLR that Dynameter measures for your music “fits” inside the Platform PLR, it can be played as loudly as the platform allows. On the other hand, if the music requires too much loudness space, then the measured PLR will be higher than the Platform PLR, and it may not be possible for the loudness management system to turn up the overall loudness as high as other songs.

Platform PLR Presets

Dynameter includes several Platform PLR presets to help you quickly see how the PLR of your songs may affect their normalized playback loudness. Since each platform has a different Platform PLR, there is no one perfect value to choose, and we have to compromise between making best use of the available dynamics, and avoiding unwanted level changes. For an example, see Appendix 2: YouTube Case Study.

Here are the measured Platform PLR values, as measured at the time of writing:

Platform	PLR
Broadcast (TV)	22
AES Recommended Min	15
Apple	15
Tidal	13
Spotify (*)	13
YouTube	13

(*) Spotify is the only platform using limiting for more dynamic songs. This means it is **not** necessary to restrict the PLR of loud songs to ensure maximum playback level, but some additional limiting may be applied if the measured PLR is greater than the Platform PLR.

Examples

“Uptown Funk” was a massive worldwide hit and had great dynamics. It measures Min PSR 8, meaning it isn’t excessively limited or clipped, while the measured PLR 11 shows there is some variety of dynamics. Furthermore, PLR 11 “fits” inside the Platform PLR of all the main streaming platforms, so the song can be played without level reduction.

In contrast, “Death Magnetic” is a famously loud album by Metallica. “Broken, Beat and Scarred” measures Min PSR 3, reflecting its heavily distorted sound with extremely restricted dynamics, and PLR 5, showing that the dynamics are very limited throughout. Both these values trigger level reductions by loudness management systems, so it plays no louder than “Uptown Funk” and lacks punch and impact in comparison to other more dynamic material in the same genre.

The song “Routine”, by Steven Wilson, is a great, real-world example in an aggressive genre. The typical PSR is 10, occasionally dipping as low as 7, but the song has a great variety of dynamics and measures PLR 15 overall. Even so, the loudest moments are 1 dB above YouTube’s reference playback level, meaning it stands head and shoulders beside any of the loudest music on YouTube!

As a more dynamic example, James Blake's recent album "The Colour In Anything" measures PLR 14, with typical PSR values of 10. This reflects the fact that it has lots of dynamic variety in it. The fact that it "needs" a loudness space of PLR 14, while YouTube has a Platform PLR of 13, means the overall playback loudness is a little lower than some songs. But the loudest moments are just as loud as anything else - in some cases a little louder than songs with much lower PLR. The loud moments balance the quieter sections, and given the style of music, this is entirely appropriate.

Finally, a famously dynamic example might be "Aja" by Steely Dan. Its typical PSR is 12, with a minimum of 10, reflecting the much cleaner recording. It measures PLR 17 overall, so can still be played with almost no level reduction by Apple Sound Check, but does measure an overall lower level elsewhere, with a couple of dB limiting on Spotify. However, thanks to the extra punch and impact allowed by the variety of dynamics, its loudness-managed playback level works very well, and sounds entirely appropriate for the genre.

The recent trend for more dynamic releases continues with more and more examples as time goes on. Three of the biggest worldwide hits recently all had Minimum PSR readings of 8 or higher: "Get Lucky" by Daft Punk, "Happy" by Pharrell Williams as well as "Uptown Funk", and in 2016 we've seen further examples of releases with better dynamics than in recent years, by artists as mainstream as Drake and Beyonce, amongst others.

Summary: PLR vs. PSR for Online Loudness

The effect of Platform PLR and Minimum PSR on playback loudness online can be summarized as follows:

1. **Consistently low PSR** readings are likely to cause your music to be turned **down**, on all platforms.
2. **PLR** readings **higher** than the Platform PLR may **prevent** your music from being turned **up** as high as other songs on that platform.
3. For music intended to sound loud throughout, you should avoid too big a difference between PLR and Minimum PSR, however:
4. Pushing either value too low won't have any benefit online, and may make your music

sound less impactful.

A song that measures PLR 10, Minimum PSR 8 will play at the **same level** as an alternative version of the same song with PLR 8, Minimum PSR 6 on all the platforms we have tested that use loudness management.

To achieve the highest replay loudness, you need to balance the Minimum PSR and PLR values of your music, *without* pushing them too low.

The examples above show that this is entirely possible - loudness management means you really can choose optimal dynamics with confidence.

Stop worrying about loudness, and start succeeding with dynamics!

The Future

In 2016, the Audio Engineering Society (AES) introduced guidelines for streaming loudness:

http://www.aes.org/technical/documents/AESTD1004_1_15_10.pdf

Unfortunately, these guidelines have not yet been fully adopted by any of the popular platforms, so each service uses a different method of measuring loudness, and a different reference level for playback.

In the future, we expect all online streaming platforms to standardize their reference level to match the recommendations (i.e. a Platform PLR of 15 or more). For this reason, we recommend being cautious about reducing the PLR of your music too aggressively, even if loudness is a priority for you.

Appendix 1: Dynameter vs. TT Meter

Dynameter was designed to be familiar to TT Meter users, but there are differences between the two. Dynameter calculates its PSR values using the ITU loudness standard, whereas TT Meter uses RMS levels. ITU Loudness takes the frequency response of our ears into account.

In practise this means that Dynameter's PSR readings will often be similar to TT Meter's "DR" values, especially when your music has a balanced EQ. For example, if you set a Minimum PSR Target of 10 and keep Dynameter's PSR History outside the dotted Target Guides, the TT Offline Meter will give a result close to DR10 if your music has a balanced EQ.

As a rule of thumb, "DR" is more sensitive to low frequencies, so bass-heavy music will often "look worse" (i.e., have lower readings) when measured using "DR". We have found Minimum PSR more useful than "DR" when assessing the negative effects of limited dynamics on the music.

Appendix 2: YouTube Case Study

Imagine you want to master a loud song with optimal dynamics. It's important to you that the song plays at a competitive level with similar material on YouTube, so you select the "YouTube" Platform PLR preset.

Because dynamics are important to you, you choose the Competitive preset. While mastering the song, you make sure the PSR values in the PSR History typically stay outside the Target Guides. This ensures the song won't be too crushed, even at the loudest moments. If the PSR values occasionally fall below your Minimum PSR Target, that's probably OK, provided they stay above 8.

If the song is loud from beginning to end, you'll probably find that the PLR naturally falls below YouTube's Platform PLR of 13. If it doesn't, consider reducing it using compression or limiting, or accept that it may be played a few dB lower than other aggressive material.

If the song includes quieter, more dynamic sections, the PLR will usually increase beyond the Platform PLR. This is fine. The loud sections will still sound loud, because their PSR is between 8 and 10. The quieter sections will sound quieter, as intended.