# DRMeter

## User Manual

MAAT Inc.

MAAT Inc.

101 Cooper St

Santa Cruz CA 95060 USA

*More affordable yet essential tools & tips at:*

*www.maat.digital*

# Table of Contents

## Introduction

Dear Customer,

Thanks for installing your copy of MAAT's DRMeter plug–in, and congratulations on committing yourself to maintaining and preserving dynamic contrasts in music!

MAAT is happy to announce that, going forward, we will maintain and further develop the plug–in formerly known as the TT DR Meter on behalf of the Pleasurize Music Foundation. MAAT carries on the heritage of this popular metering tool, which has transformed the way the music industry views dynamic range.

The MAAT DRMeter plug–in and companion MAAT DROffline measurement utility is an almost one–to–one replica of the original. We've done a lot of testing and tweaking to make sure that you get the same familiar and much loved ballistics of the now legendary original TT DR Meter, which has already helped to preserve dynamics for thousands of modern pop releases and multi-millions of records sold within the past eight years, including the extraordinary Daft Punk release, Random Access Memories.

The only difference you will find between old and new is the removal of the Correlation meter and Mono Button. This was done, in response to user requests, to reduce UI height so the DRMeter will fit on smaller displays. We have implemented those functions in another plug–in from MAAT, the free 2BusControl, which also includes solo buttons for Left, Right, MONO & DIFF, plus a left-right Flip button and a useful Balance meter. During mixing and mastering, it is often useful to listen to the left minus right or DIFF(erence) content versus MONO content while having the signal fed to both speakers equally. Go grab your copy of 2BusControl today at: https://MAAT.digital/2bc.

This basic or micro version of DRMeter is the first step. For a more fully featured version that supports display of True Peak values above 0 dB and all R 128 and A/85–compliant standards plus new measurement tools, head over to the measurement section of our site, and take a look at DRMeter MkII.

All of DRMeter's functionality is wrapped in an information rich yet visually unobtrusive user interface that occupies only a small portion of horizontal screen real estate. Likewise, the plug–in is "light weight," demanding a minimum of CPU resources so it won't slow down your host. We've worked hard to make this an exceptionally useful and usable tool for estimating DR values.

## Installation & Setup

When preparing for installation of your MAAT DRMeter, we recommend that you quit all applications prior to proceeding. Also, after

downloading the installer and prior to installation, let any anti–malware measures you may have running scan the installer. Then, temporarily disable all anti–malware measures once scanning is complete.

To install, simply double click on the downloaded Installer for your particular operating system. The installation process will guide you through the install procedure. If you have an older OS version, restarting your host may be required. Don't forget to reënable anti–malware measures or simply restart your host.

## Licensing

MAAT software is licensed through our dongle–free, cloud–based license control framework. If your hosts are net–connected, our licenses "float," making it easy to move from one machine to another. All you have to do is close all MAAT stuff on one machine before you open anything on another. If you're going to use the laptop in an environment where internet is spotty or non–existent, you can also go offline temporarily for up to 30 days.

To license your MAAT purchase, open yours or instantiate an example in your preferred plug–in host. When licensing, we recommend you open a new session in your DAW just for this purpose.

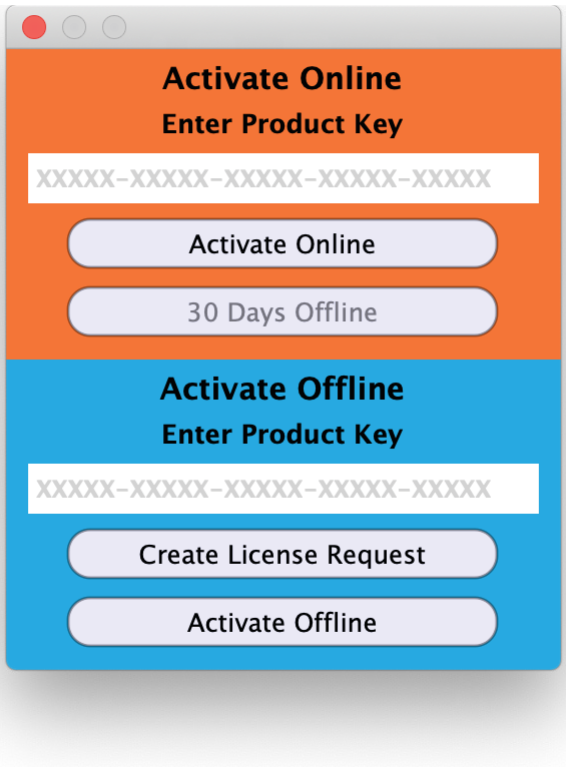


*Figure 1: The initial Activation dialog*

### Online Activation

Once the Activation dialog appears, paste or type in your Product Key supplied at the time of purchase. Then click on Activate/Deactivate Online and follow the prompts.

**NOTE: THE ONLINE PROCESS REQUIRES A LIVE INTERNET CONNECTION. YOU MUST HAVE AN ACTIVE INTERNET CONNECTION FOR ACTIVATION.**

A feature of our cloud–connected system is that, if you close a DAW session that contains MAAT plug instances, then open that session on another host, the license will "follow" you onto the new host as long as you have live internet.

You can also return or park your license on our licensing server, and pick it up later on another host. Once your product is licensed, click the Activate/Deactivate Online button to deactivate your license, then repeat to reactivate.

### Offline Activation

If, for security reasons you have an offline host computer or you plan on working without a reliable internet connection, it is best to go with an offline license. There are two offline options, temporary offline and full offline.

#### Temporary Offline

If you plan on working without a reliable internet connection, we designed the temporary offline option just for you. The temporary offline process also requires a live internet connection, but only during activation.

A temp offline license has two unique features:

- It can remain offline, without an internet connection, for up to 30 days
- It auto–renews its lease whenever it does make a server connection

So, if your internet is spotty or unreliable, or you're heading temporarily to a location where an internet connection isn't available, the temporary offline option let's you work untethered to the 'net for up to a month.

By clicking the "30 Days Offline" button, your online license will become temporarily offline for a maximum of 30 days. If, however, you use the product while connected to the internet at all during that time, the "lease" duration is automatically reset, extending another 30 days.


*Figure 2: The 30 Days Offline activation option*

Full Offline

This will license your MAAT product without the need to periodically contact our licensing server. If you anticipate working without the internet for more than a month at a time or, for security purposes, your studio machine is "air gapped" and has no internet, take a moment to surrender your online license, and replace it with an offline version.

Note: A full offline license does need to be explicitly renewed once a year.

To prepare for offline activation, you will need:

1. Your Product Key!
2. Some method to move your License Confirmation file to the offline host machine.

That latter requirement can be accomplished in any number of ways, but a USB flash drive is often readily available and most convenient. You will also need your Product Key that was supplied to you via e–mail when you purchased your MAAT product.

The offline activation process starts with generating a License Request, with a "maatr" file extension, which is submitted on–line to

our server or via e–mail to MAAT Support <support@maat.digital>. A License Confirmation file, with a "maatc" extension, will be returned to you, which will activate your product.

To proceed, click on the Activate/Deactivate Offline button, and follow the prompts.

In a year's time, 365 days from the date the maatr file is created, a full offline license must be renewed using the same maatr/maatc method.

# Introduction

## Why DR?

Integrated DR or DR*i* is an ad hoc metric that has become a de facto standard worldwide in both the pro and enthusiast audio communities. DR*i* is a method of measuring dynamic range that better correlates with subjective experience than crest factor, PLR, RMS or the EBU's R 128. DR*i* was designed specifically for that purpose, not to provide automated Loudness control of program and interstitials as "R128" and A/85 were.

"Dynamic range" measurements derived from EBU R128's LRA or Loudness Range metric is not designed for people, it was designed for other algorithms to digest. As specified in BS.1770-4, the LRA algorithm purposefully excludes the top 5% of dynamic range, which is uninteresting for broadcasters yet is essential for popular music as that the pregram material happens almost exclusively in the upper 5 to 15% of amplitude. RMS, PLR and crest factor are not reliable metrics either, as there are several ways to derive them and thus are not repeatable and interchangeable.

We at MAAT, having been in the business of fighting the Loudness Wars for over two decades while serving on the *ploud* committee that formulated R128, have created a better dynamic range metric simply called DR. MAAT's integrated DR is the only method for measuring the dynamic density of music releases as perceived by your customers, not loudness normalization algorithms, and is used and valued by tens of thousands of consumers and audio engineers.

DRi is an easy to understand integer value and, because it is standardized, it is deterministic; you always get the same measurement when gauging the same material. So, the DR3 of a metal track is always DR3 regardless of who measures it. This means Billy can compare his DR3 reissue with Susan's original version, at DR5, and they can make the meaningful inference that the reissue was "remastered" and made (needlessly?) louder. DR*i* is subjectively relatable, repeatable, interchangeable and easily comprehended.

## The Interface

Once installed, the plug–in appears in your DAW as MAAT DRMeter.

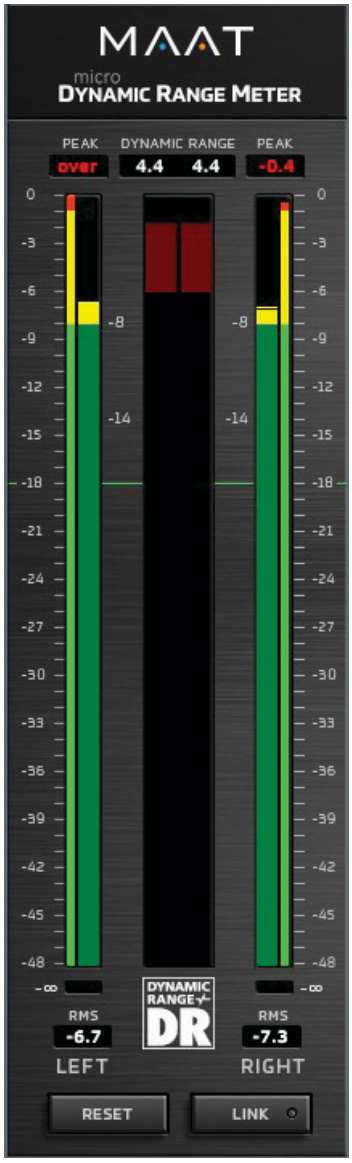


*Figure 3: The DRMeter user interface*

The straightforward DRMeter user interface contains three real time meters, and three numeric fields for each channel. The meters are nested, with SPPM or Sample Peak Program on the outside, RMS inside of that, and estimated DR in the center. At the top, momentary numeric DR values are flanked by sample peak hold values. The sample peak fields turn red as you near 0 dBFS, and instantaneous "overs," above 0 dBFS, are shown as OVER. The RESET button at bottom left will reset all measurements.

The bottom right contains the LINK button, used to provide joint measurement of left and right channels, which simulates the operation of the DROffline measurement utility. Remember, the DRMeter plug–in is a real time DR estimating tool. Due to the nature of the DR measurement, the plug–in cannot provide actual DR values for a song, file or track. The companion DROffline utility, which measures an entire file to generate a DR value, is the only tool available for measuring official DR. See maat.digital for more information on the DROffline.

## Quick Start — PLEASE READ

We know, reading is old school and such an easy tool to use as the DRMeter would seem to be self evident, wouldn't you think? However, before you dive right in using this tool, we want to make a few things clear so you will get the best use out of your copy of DRMeter. Thanks for struggling through this part!

### Our Goal

Our clearly defined goal is to discover and categorize aggressive amplitude compression and to prevent signal "overs" with reliable peak metering. The DR system supplies an easy to understand, integer number, from DR4 to DR14, which defines the dynamic quality of a recording at a glance.

We can´t point that out often enough: The aim of the DR Tool is to offer an easy to understand, whole number value, which describes the degree of dynamic reduction vs. the amount of inherent dynamics. It does this by focusing on the top 20% of loudness events, and counting the average of those 20% against peak amplitude. Designed as a motivation to back away from loudness war–driven mastering decisions, the DR measurement system is best suited to all modern and popular mainstream music genres. Due to the natural obstacles of dynamics measurement in general, DR values are more precise for smaller values, where there is little contrast between loud and soft, and may deviate more the higher the DR value. Read further to understand the obstacles of dynamic measurement in general.

### In Use

Let´s start with a few important rules to properly measure and interpret your DR measurements:

1. For "official" DR values, always use the DROffline measurement utility. This real time plug-in version of the DRMeter is not capable of exact measurements. Official DR values are cumulative over the entire length of a song, from start to end.
2. Use the DRMeter to get a feel for the approximate DR value. To do this, go to the loudest spot(s) in your program, play that material and read out the value with the DRMeter set to "Link" mode.
3. Here are two scenarios for potentially misleading meter readings and the requirement for sensible interpretation:

a) A pure tone or sustained note has almost zero dynamic range without anything to contrast it to. So, A sine wave measures 0 DR because peak equals loudness. Now, imagine a relatively dynamic jazz song, with a great lead singing a pretty loud, long *ff* note at a spot with almost no back beat. This will show almost zero Dynamic Range because the plug–in is measuring the contrast between louder events, mostly percussive transients, and lower events, mostly less percussive harmonic content. If

most of the song fits the above description, you'd possibly arrive at a DR of 3 or 4 despite the song not necessarily being hyper–compressed. The nature of dynamic measurement can be cruel, so skillful interpretation of real time results is essential.

b) Another example: Imagine receiving a mix for mastering with a kick proportionally 4 dB too loud. That is, the kick is "sticking out" of the mix by 4 dB. You ask the mixing engineer to deliver an alternative mix with the kick reduced by 4 dB. That second mix would likely read 3 to 4 dB smaller DR than the balanced mix. So, which mix is better? Certainly, the second one with a better balanced kick but a lower DR value!

4. Always judge DR in conjunction with the program you are measuring. A trance track at DR5 can sound incredibly good, as opposed to many DR2 to DR3 competitors, while a rock song would most likely sound squashed and distorted at DR5. Use the following table as a rough guide:

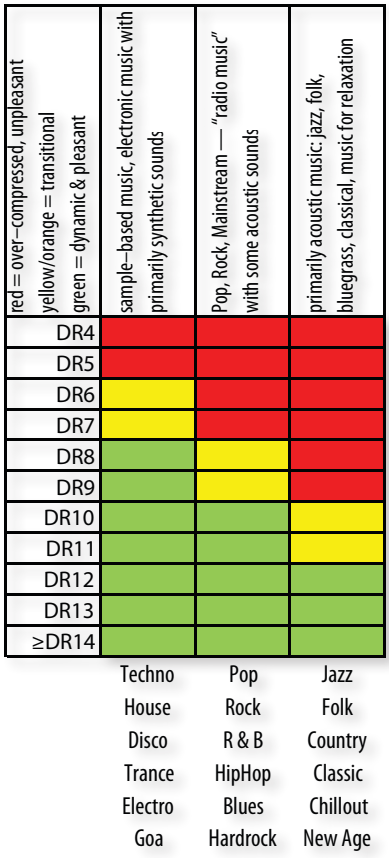


***Table 1: Genre vs DR***

5. Dynamic contrast is an important factor for musical expression. To judge how much dynamic reduction doesn't harm dynamic integrity, focus on dynamic events in the mix when doing loudness–compensated A/B comparisons.

6. The DR algorithm has been designed and crafted to deliver easy to digest measurement of hyper–compressed main stream

music releases. The aim is to bring back, for general music releases, more dynamic contrast and listening pleasure with less fatigue. It was not meant to measure the dynamics of an *a capella* Gregorian choir. It wouldn't make sense as, due to the absence of transients, the DR meter would show misleading lower results. Frankly, we haven´t found a satisfying solution to solve that issue yet, though there isn't a huge demand.

## Results Count

So far, the DRMeter has helped to create more transparency and awareness about the "dynamic quality" of music releases. The DRMeter was and is not meant to create a meaningless anti–loudness contest based on the largest DR values in the universe. This simply makes no sense for the majority of music releases. Also, average listening situations, with some degree of background noise, will rob you of perceptual dynamic range. Nowadays, we have smart technology to control dynamic so that the musical impact of dynamics can be preserved while creating results which translate well to radio, streaming and other common distribution methods. This is especially true as loudness normalization becomes ever more accepted, which destroys the impetus for any loudness wars. Spotify, iTunes Music, even YouTube are now loudness–normalized, though to different target loudness levels, so material mastered with compromised dynamic contrast will actually be amplitude–reduced, made quieter, without your client's knowledge or consent.

Here's a last suggestion for the impatient: Go to pleasurizemusic.com and have a look at the tutorials, and maybe gain some knowledge about metering. Working smarter helps to create outstanding results.

### PCM versus MP3 DR

I can´t resist adding this information because thousands of users have asked…We had been reluctant to allow DR measurement of MP3 files and other lossy formats for a specific reason. It's not because of a technical problem, it's simply that a quirk of lossy encoding cause erroneous measurements.

For MP3 files, you typically see a measured increase in peak values and a small decrease in RMS as a logical result of the processing which is applied to the source PCM files during encoding. This can be a very subtle peak–to–loudness increase of 0.1 to 0.5 dB, but in some cases it can be an increase of up to 3 dB and thus can cause an MP3 to show a far higher DR value as it´s source PCM, up to 3DR. This certainly doesn't mean that lossy files would sound better or be more dynamic. It´s just that MP3 encoding blurs the signal so drastically that we want to encourage the audio community to use DR only for PCM or lossless files.

Geek Alert : High PLR or Peak–to–Loudness Ratio increases can happen if the input level of an MP3 encoder has been reduced to prevent overload and distortion. If no level reduction had been applied prior to encoding, the increased peak values of the decoded MP3 will become

True Peak (TP) "over" values higher than 0 dB Full Scale. TP overs are not considered in the DR algorithm, as that makes no sense at all.

BTW, thank you for reading that far! We are not done quite yet, and there's more interesting and important information to come. So, please stay with us for a tiny bit more…

### #1 Rule for Audio Metering

Metering is only as good as the knowledgeable interpretation of the measured values. So, a solid understanding of dynamic measurement is essential.

Despite the relatively new ITU BS1770–based global standards for various audio metering metrics, the world of dynamic metering is still very adventurous. We have LRA or Loudness Range, and you often hear about PLR as mentioned above. Unfortunately, there are a lot of other difficult to understand algorithms for measuring dynamics.

## Terminology & Dynamic Range Basics

To understand the general topic of "Dynamic Range" measurements, we need to think about that phrase for a moment, Because of the inherent imprecision of this term, conversations can quickly get a bit weird…

You could think of Dynamic Range as the total variation of dynamic expression within a piece of music. And if we simply measure the range from the quietest event and the loudest event of a recorded performance we would almost always end up close to the System Dynamic Range or dynamic range of the encoding method. Compact discs have a roughly 96 dB of system dynamic range. Almost every digital release contains full scale events, hitting the "digital ceiling." In contrast, within an fade out to digital black, we find musical information getting as low in amplitude as our System Dynamic Range permits. For a CD, that would be -96 dBFS.

At this point we already have two variations of the term Dynamic Range:

A. Perceptible Dynamic Range, the dynamic range of our listening environment which, in turn, depends on the quality of the playback system plus acoustical background noise.
B. System Dynamic Range, which describes the technical dynamic range of a system, such as 144 dB for 24 bit fixed point linear PCM.

Furthermore, the System Dynamic Range has two subgroups: the theoretical digital dynamic range of a system, the 144 dB mentioned above for 24 bit LPCM, or the dynamic range of a signal sub–system, such as a DAC or amplifier. That sub–system dynamic range is usually labeled as SNR or Signal–to–Noise Ratio. We think you'd agree that, though both of the above system dynamic range concepts are useful, they're meaningless for our purposes.

Before digging into more meaningful systems to describe music–oriented dynamic variations, we'd like to point out a major problem which is

inherent to measurement and subjective perception. Within the audio technology community, you'll find a lot of research about dynamic range and associated topics, and many studies are unfortunately based on erroneous assumptions. Recent research of the PMF (Pleasurize Music Foundation), led by Friedemann Tischmeyer, revealed the inability of the listener for clear and repetitive subjective evaluation of dynamics and the vitality of the transient structure. Even a group of skilled professional listeners proved this inability of the human ear to properly evaluate dynamic quality and transient vitality.

In conclusion, this simply means that our hearing apparatus had not been trained to distinguish this parameter due to evolutionary requirements. Because the "Loudness War" was the first opportunity to learn and adapt to hyper–compression, our hearing has not been able to evolve. But, don´t worry, this doesn´t mean that DR or Transient Vitality is irrelevant for our hearing pleasure. Research also shows that the most important part of our hearing process happens in the brain on a completely subconscious level. And here DR and Transient Vitality really matters, allowing "easy" or relaxed processing of consumed music by our brains. The PMF, with the help of MAAT, will undertake further and more in–depth fundamental neuroscience research to provide more profound insight into our subconscious hearing abilities and functions.

## Getting Your Geek On

Now let´s look into the technical principles behind DR and dynamic range measurement algorithms…Technically you will find two basic principles being used for dynamics measurement:

A. Deviation of loudness distribution within a complete song from top to tail
B. Difference between average and peak loudness within a complete song from beginning to end

All popular measurement methods or standards are based on, or derived from, either method A or B.

The R128 LRA or Loudness Range standard is a derivative of method A. The name is descriptive, because LRA exactly describes a range of loudness. It does this by measuring weighted loudness values, then feeding that information into a histogram which compiles a history of how often particular values appear. The range in dB is then derived, in LU, between the estimates of the 10th and 95th percentiles of the distribution.

This is an oversimplification. You can read all the gory details by searching for the official ITU LRA technical spec. We simply want to point out the principle of using the difference range of loudness distribution. The practical conclusion is that LRA turns out to be useless for dynamic measurement of pop and MOR music genres. This is due to its inherent design, which ignores the top 5% of content, in terms of amplitude, so as to prevent extremely loud passages from affecting the overall result.

Unfortunately, that top 5% of amplitude is where 90% of modern music lives! To be fair, LRA was designed to evaluate broadband material, of all types and styles, for broadcast purposes.

Another dynamic range measurement method is PLR, the oldest known technique based on method B above. PLR simply measures the difference between peak and average loudness. It´s also commonly known as crest factor, and is useful as a diagnostic but not as a gauge of subjective dynamic range or the degree of hyper–compression.

PLR has two disadvantages. It lacks standardization, as the peak measurement, loudness calculation and if weighting is applied are all not codified. PLR's second drawback is that it measures the overall loudness of a song and counts the overall average against the peak. This means that a song with a very mellow intro and soft verse but super heavily hyper–compressed chorus would show a more dynamic value than a constantly loud song which is less compressed then the chorus of the song with more overall macro–dynamics.

By now, you see that "dynamic range" measurement could cause all of us some headache. This is the reason why we offer the DRMeter, because it's the only useful tool available to reliably describe the "dynamic quality" or density of modern pop and MOR.

Tischmeyer purposefully designed the Dynamic Range metering system to create an easy to understand tool that displays the degree of dynamic reduction within the loudest portions of a program. The official DR value, as measured only with our DROffline utility, focuses on "hot" spots of music releases, meaning the loudest portions such as choruses where severe dynamics processing is most relevant. When thoughtfully used , the DRMeter measures louder portions of the music rather than the overall macro–dynamics. The DRMeter is the best real time measurement tool available on the market to fulfill this purpose, despite having some compromises stemming from the complexity of Dynamic Range measurements.

Technically, DROffline splits the loudness values of the measured song into 10,000 different quanta, and feeds that information into a histogram, which provides needed statistics about the loudness distribution. Then, it gates 80% of the material, taking the loudest 20% of the histogram or loudness events and measures the difference to the second loudest peak. Thus DR is a hybrid between methods A and B, and is a bit closer to PLR then to LRA.

As DR became broadly accepted and has turned into a de facto standard, we have decided to stick to the term DR rather than Dynamic Range which is a good way to distinguish DR from other derivatives of dynamic range measurement…Thanks for listening!

## General Use & Limitations

Important! The only way to get an official DR value is to use MAAT's

DROffline! The DRMeter Plug–in is designed as a responsive, dynamic density estimator.

Plug–in formats, regardless of whether they are VST, AAX, or AU, are not really well suited for graphic representation. Built on a series of compromises, each DAW and each plug–in interface puts audio calculation at a higher priority than graphic representation, which is understandable. This is why truly professional meters are either hardware devices, native–running software which uses the host's CPU and GPU resources directly, or host–integrated solutions. All these allow access to graphic and measurement information in a way which makes it possible to tightly control a meter's "ballistics" or response to time–varying input. In addition, plug–ins cannot save values and create histograms, which are needed to reach our objectives.

This is why the MAAT DROffline serves to measure "official" DR values, with the advantage of being able to measure an entire album within a few seconds. The real time plug–in DRMeter does provide accurate numerical values as a Sample Peak meter and serves as a guide for the available dynamic range and the approximate DR value that you should expect. For this, the plug–in can be applied to measure the loud passages of songs. The timing of the metering can vary, depending system latency and the mode of operation of the host application.

We have worked hard to create a fast, smooth and responsive user experience which allows intuitive and simple monitoring of peak, loudness (RMS) and approximate DR values. We have tested and optimized the plug–in with a number of different host applications. Despite system–dependent limitations, we have obtained very good graphic results in most cases.

## DR Logos

The DR logo pack and guidelines for use are included in the documentation directory of the DROffline installation. For more information on DROffline, head to maat.digital and click on DROffline in the Products section.

## In–Depth Usage

Instantiate the plug–in into the last slot of your host application's master bus, after the output fader. How to do this varies from one DAW to another. If you are not sure, please check your workstation's user manual. Don't forget to set the output faders to 0 dB or unity gain.

### SPPM Meters

Numeric Peak is numerically displayed with one decimal point and corresponding Sample Peak Program meters level bar meters on the outside. When close to full scale, peak measurement is particularly complex and critical. Fixed point AES/EBU digital audio can only show values up to

full scale since, strictly from a numeric representation, no samples over full scale are possible. However, contiguous full scale data words create audible "overs," also known specifically as interleaved sample overs.‡ — see below.

Floating point calculations make it possible to represent values well over 0 dB. The measurement and display of peak values after 4 times over sampling leads to a display of overs so frequently that we made a compromise solution for DR. Peak values are measured "normally," and provided numerically. In the case where two contiguous bit words show full scale without oversampling, and at the same time a value over 0 dB is detected via oversampled metering running in parallel, then the peak display shows "OVER."

Values higher than -0.5dB will be displayed in red, to warn you to be cautious. The EBU recommends maintaining 1dB of True Peak headroom, which is too much for today's loudness driven music world. Having a peak headroom between -0.5 and -0.3dB will prevent your masters from subsequent clipping and will be, in most cases, already MfiT (Mastered for iTunes) compliant, so that 256 kbps AAC files encoded from such masters won´t clip.

MAAT's DRMeter is an almost one for one reissue of the circa 2008, original TT DR Meter. Back in the day, before the establishment of the True Peak standard within R128 / BS 1770, it was too risky and presumptuous to release a meter showing values that would exceed digital full scale zero by a couple of decibels. Our DRMeter MkII will also display values over 0 dB, compliant with the R 128/BS 1770 True Peak Metering standard.

The Peak bar display ranges from -48 to 0 dB. A peak-hold with slow release time makes it easy to read and follow the values visually.

‡ Interleaved Sample Overs, also known as inter-sample peaks, are digital overs which can be detected only after multiplying the sampling rate, or "over sampling," by a factor of 2 or 4. The values are not detected in Sample Peak Resolution (SPPM) because values only up to 0 dB can be represented in fixed point notation as mentioned above. An interleaved sample over can also occur when the peak headroom is 0.1 dB or more and creates distortion only after leaving the digital domain during conversion to analog or/and when encoded into lossy formats.

## Numeric DR Display

In link mode, the joint DR Value is shown to one decimal place. Using the meter on the loudest passages produces values which are very close to those of the DROffline. If the LINK button is inactive, then two separate DR bars are shown with corresponding numerical displays above the bars. This Unlinked mode is appropriate for the mixing process in order to have separate, detailed information concerning the inner dynamics of each stereo channel. For mastering, we recommend that you enable Link mode.

## DR Bar Meters

The wide central, color coded bars display the momentary dynamic density, estimating DR. Values of less than DR8 are displayed in red, while values of DR14 or more are shown in green. Values between are displayed in various shades of yellow and orange.

The bar meters do not display any static information. So, in order to indicate the top 20 RMS values as done in the DROffline, in specific situations the display doesn't always mirror the official values given by the DROffline meter. Keep in mind that the objective is to standardize the "thickness" or dynamic density of a recording and not measure the overall dynamics. The variation between the two measurement devices increases as the dynamic range of the material measured is increased.

## Null Data Display

The blue "-∞" indicator lights up when null data is present at the input.

## Numeric RMS Display

The ballistics of the momentary numeric displays are highly damped. The displayed average loudness value is very useful as a rough guide to the current loudness.

## RMS Meters

In 2008, after comparative testing, we decided to use the standard RMS or Root Mean Square calculation of loudness as it proved to be superior to most other measuring methods with complex frequency weighting models. Those methods, which are controversial among specialists, also require a relatively large amount of CPU resources. The idea behind the DRMeter is a simplified way of determining dynamic density and is not a psycho–acoustically perfect loudness measurement tool. The RMS value is corrected by +3 dB so that sine waves have the same peak and RMS value, as is the case with most other RMS meters. Our DRMeter MkII supports all common BS 1770–based standards including Max Momentary, Short Term, integrated Loudness, TPL or True Peak and LRA or Loudness Range.

The horizontal green tick mark, at -18 dBFS/RMS, is a great orientation for your level staging. This level is excellent for recoding, and it's a perfect level to hit your outboard sends with when inserting your fave boutique EQ and compressors during mastering. Because -18 dBFS/RMS equals 0 VU in the analog domain, you have a good chance of hitting the signal level sweet spot for all your analog outboard gear.

## RESET

DRMeter has a RESET button located at bottom left. The RESET button resets all displays simultaneously. Stopping and restarting playback resets the numeric peak display, in the same way that clicking the RESET button does. The numerical display shows the highest value reached since the last reset.

### LINK

The LINK button links enables joint left and right channel calculations, awhile fusing the normally stereo DR bars into one. Enabling Link mode is a good default and applies to most working situations.

## Using Limiters

Despite maintaining adequate headroom, please always use a professional brick-wall limiter for mastering. There are many good brick-wall limiters available on the market but, as with all gear for the "pro" market, also many poorly performing ones that don't deliver what they promise. Be an informed buyer, and verify your brick-wall limiter. Hear with your ears and not with marketing messages!

A brick-wall limiter's job is to make sure that no interleaved sample overs are produced, using the over sampling process described above. A brick-wall limiter should process the sound in such a way that the actual level reduction is completely transparent and thus, inaudible.

### Maintaining Headroom

Despite using a good brick-wall limiter, there are three reasons for leaving some headroom:

Modern D/A converters use linear phase FIR or Finite Impulse Response reconstruction filters which are not always designed to process full scale signals without distortion. This is particularly true of steep-sloping, high slew rate signals which can produced by hard limiting or over–compressed music. Extra headroom significantly reduces this risk, while making any reduction in amplitude practically inaudible. (For more geeky fun, read about the Gibbs Phenomenon)

Additional headroom reduces artifacts used by all perceptual data compression schemes which employ the masking effect. The lower the data rate of the target format, the more headroom is necessary. For highly compressed music, 0.5 dB of headroom is not sufficient in order to avoid distortion. In this case, a headroom of up to 5 dB would be theoretically necessary. Recordings which have the DR logo are fortunately not so aggressively compressed; a headroom of 0.5 dB prevents unwanted artifacts in most cases for 256 bps or higher lossy data formats!

Research has shown that even EBU–compliant True Peak measurements with 4 times oversampling has an "under read" of potential inter–sample overs of 0.5 dB. For this reason, all television audio content requires, according to regulation, a peak headroom of  1dB in Europe and 2 dB in the US. As the music industry is not regulated and we haven´t completely escaped the reality distortion field of maximum loudness demand, 0.5 dB of headroom seems to be a workable and acceptable value to create more transparent results.

### Why 0.5 dB?

In order to prevent any discussions among experts: Yes, the above headroom value of 0.5 dB is somewhat arbitrary. It could just as well be 0.353, 0.478, or 0.51 dB headroom, but 0.5 is a good rule of thumb.

## Updates

Please always use the latest version of the software! Future optimization of the measurement algorithm could lead to slightly different results in the future.

## Specifications

### System Requirements

- macOS: 10.8 and newer, 64 bit
- Win: Windows 7 and newer, 32 & 64 bit
- Pro Tools 10.3.10 and newer
- 4GB RAM minimum

Supported Platforms

- AAX, AU, VST 2/3 Mac & Win

## Credits

DR idea, overall concept & realization:

Friedemann Tischmeyer, PMF & MAAT Inc.

Technical concept & project management:

Dr. Christoph Musialik, Algorithmix GmbH

Initial programming:

Dr. Ulrich Hatje, Algorithmix GmbH

Re-programming for MAAT:

Agent Tad Nicol, MAAT Inc.

## Support

For product support, e–mail us at:

support@maat.digital

Would you like to help MAAT? Help support the PMF and MAAT by sharing the love…Like us on Facebook:

https://www.facebook.com/maatdigital/

and Twitter:

https://twitter.com/maat_digital

and tell your friends about us!

# About This Manual

This manual was written in Adobe InDesign 15.0.3, and is set in Robert Slimbach's Minion Pro and Myriad Pro. The cover page is set in Aldo Novarese's modernist geometric Eurostyle.

This documentation, as well as the software described in it, is furnished under license and may only be used or copied in accordance with the terms of such license. The information in this manual is furnished for informational use only, is subject to change without notice, and should not be construed as a commitment by MAAT Incorporated. MAAT Incorporated assumes no responsibility or liability for any errors or inaccuracies that may appear in this document.

Except as permitted by such license, no part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, recording, or otherwise, without the prior written permission of MAAT Incorporated.

## Notice of Liability

The author and publisher have made every effort to ensure the accuracy of the information herein. However, the information contained in this document is provided without warranty, either express or implied. Neither the authors, MAAT Incorporated, nor its dealers or distributors will be held liable for any damages to be caused either directly or indirectly by the instructions contained in this book, or by the software or hardware products described herein.

MAAT INCORPORATED MAKES NO WARRANTIES, EXPRESS OR IMPLIED, INCLUDING WITHOUT LIMITATION THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, REGARDING THE APPLE SOFTWARE. MAAT INCORPORATED DOES NOT WARRANT, GUARANTEE, OR MAKE ANY REPRESENTATIONS REGARDING THE USE OR THE RESULTS OF THE USE OF THE MAAT INCORPORATED SOFTWARE IN TERMS OF ITS CORRECTNESS, ACCURACY, RELIABILITY, CURRENTNESS, OR OTHERWISE. THE ENTIRE RISK AS TO THE RESULTS AND PERFORMANCE OF THE MAAT INCORPORATED SOFTWARE IS ASSUMED BY YOU. THE EXCLUSION OF IMPLIED WARRANTIES IS NOT PERMITTED BY SOME STATES. THE ABOVE EXCLUSION MAY NOT APPLY TO YOU.

IN NO EVENT WILL MAAT INCORPORATED, ITS DIRECTORS, OFFICERS, EMPLOYEES, OR AGENTS BE LIABLE TO YOU FOR ANY CONSEQUENTIAL, INCIDENTAL, OR INDIRECT DAMAGES (INCLUDING DAMAGES FOR LOSS OF BUSINESS PROFITS, BUSINESS INTERRUPTION, LOSS OF BUSINESS INFORMATION, AND THE LIKE) ARISING OUT OF THE USE OR INABILITY TO USE THE MAAT INCORPORATED SOFTWARE EVEN IF MAAT HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. BECAUSE SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF LIABILITY FOR CONSEQUENTIAL OR INCIDENTAL DAMAGES, THE ABOVE LIMITATIONS MAY NOT APPLY TO YOU.



2000602-3.6