: NUGEN Audio

MasterCheck

Producing for today's digital music services

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Contents

Introduction

The NUGEN Audio MasterCheck is a meter designed to facilitate the production of high quality audio in the paradigm of Loudness normalisation, with particular focus on the music industry and podcast community. The meter includes internationally recognised loudness measurements, dynamics monitoring and ITU compliant truepeak inter-sample metering to provide a comprehensive set of tools that enable confident audio production, both in reference to existing material and in the context of fully exploiting the available headroom in a loudness normalised environment.

MasterCheck has five primary applications:

1.   Audio production to a loudness target

Consumer audio consumption is increasingly being delivered through loudness normalised channels. iTunes RadioTM, SpotifyTM, WindowsTM 8 and others all incorporate loudness normalisation, which is designed to ensure that the user receives audio at a consistent level and doesn't have to constantly reach for the volume control from track to track. This has repercussions for the audio producer, your 'hot' master will be effectively turned down automatically at playback – in other words, there is no longer any advantage in 'being louder' than the loudness level as determined by the playout system. Using 'Offset to match' button in MasterCheck will immediately show you how your audio is going to sound to the listener, allowing you to mix with this reality in mind.

Mixing and Mastering to playout loudness targets allows you to take full advantage of an increased headroom (and increased dynamics) that would otherwise be lost due to the loudness normalisation process.

2.   Measuring dynamic content

MasterCheck introduces new standardised numerical measures of dynamic content (dynamic range) within audio, the Peak to Loudness Ratio (PLR) and the Peak to Short-term Loudness Ratio (PSR). MasterCheck provides both an integrated program measure, and a short-term meter, showing the dynamic content of the audio at playback.

3.   Avoiding downstream clipping introduced by compression codecs

These same consumer channels also employ compression codecs (mp3, AAC, Ogg etc.) to reduce the file size/bandwidth required. Unfortunately, these codecs do not handle high levels well, introducing clipping into the signal. Inter-sample true-peak monitoring can be used to reduce this. The True-peak level as defined in ITU-R B.S. 1770 (or by the Apple afclip variant) gives a more accurate representation of the levels in the signal than traditional sample-peak metering. Mixing to a level of -1dBTP (or -3dBTP for mp3), helps avoid introducing downstream distortion when compression codecs are employed.

Codec monitoring and metering (MasterCheck Pro only). MasterCheck Pro also provides codec monitoring and metering. This allows for the real-time encoding and analysis of up to 5 codecs streams simultaneously, simulating the real-world consumer listening experience and allowing limiting to be applied to produce an optimal master for today's digital delivery systems.

4.   Comparing your dynamics and loudness levels with reference material

In addition to targeting recognised playout loudness levels, MasterCheck can take a reference track as a source for comparison. This can be a useful tool when comparing your work with respected material in the same genre, helping you to determine appropriate compression levels and characteristics.

It is also possible to use MasterCheck in a mix to determine loudness differentials between different tracks and groups. This technique can be used to maintain dialogue clarity during radio and podcast mixes where a differential of dialogue level over M&E is desirable.

5.   'Removing' loudness from the signal chain

A difficulty in applying compression and limiting is that these techniques inevitably boost the loudness of the output - louder audio, sounds better. As a result, it can be very difficult to determine if the effect is actually making things sound better, or it is just that we prefer the sound when it's louder. MasterCheck can be used to A/B your audio with and without effects, whilst simultaneously matching the loudness, to allow you to make a truly objective assessment of the processing applied – remember, once you mix to a level louder than the playout system, any additional loudness you achieve will be automatically turned down. MasterCheck allows you to choose objectively what you do with this additional headroom without being misled by loudness mismatches.

Main Interface

With the exception of the Codec encoding, monitoring and metering section, both MasterCheck and MasterCheck Pro provide the same functionality, via a slightly different layout. The MasterCheck Pro interface can be switched between the compact and codec layouts using the 'Mode' control in the settings panel [11].
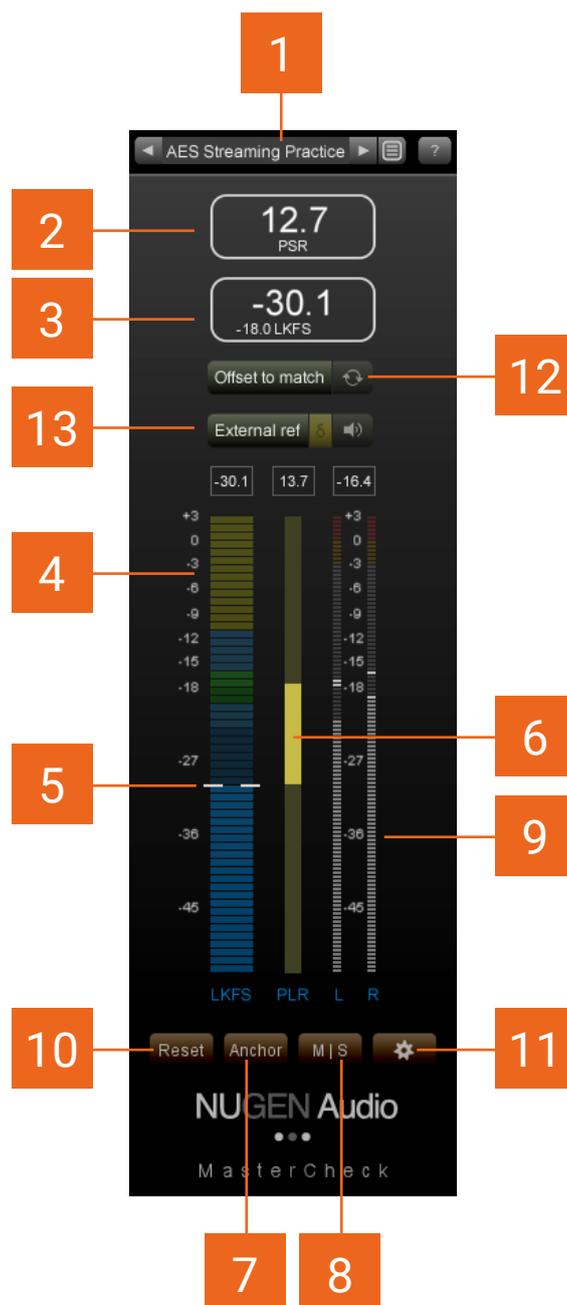
1   Utility controls

Preset browser. Use the arrow buttons to step sequentially through the presets or click the end control to open the preset menu to select from a list.

Double click the name to re-name session presets.

Preset Management.

The 'Installed' folder contains the factory presets. These cannot be overwritten.

User presets can be saved in the 'User folder'. An '*' symbol will be shown against the preset name if the settings have changed from the saved version.

Additional folders can be created using the '+' button

Presets and folders can be organised by clicking the '...' symbol which is highlighted when the mouse pointer is placed over the folder/preset name. Folders can be deleted, renamed and browsed using the standard OS interface. Presets can additionaly be moved and copied.

? Opens the 'About' page, with access to credits, de-authorisation options and the product manual (if installed).

2   **PSR.** The PSR (Peak to Short-term Loudness Ratio), gives a real-time PSR reading for the audio during playback.

3   **Program Loudness.** Measured according to ITU-R B.S. 1770. This is the integrated program loudness value since last reset, and is generally used as the target value for loudness normalisation. The target value (either as defined in the settings or derived from a reference track, if active) is shown in the bottom left corner.

4   **Short-term Loudness meter.** Showing loudness over a 3 second sliding window according to ITU-R B.S. 1770, giving a real-time loudness value for the audio during playback. The numerical value at the top of the meter shows short term loudness.

5   **Program loudness indicator.** This overlay shows the intergrated program loudness level.

6   **PSR meter.** Showing the Peak to Short-term loudness, giving a real-time PSR for the audio during playback. The numerical value at the top of the meter shows the PLR, Peak to loudness ratio, using the integrated program loudness value since the last reset.

7   **Anchor.** Anchors the PSR meter to the top of the scale. This can be useful in making a reading against the scale.

8   **M|S.** This button can be used to switch the metering into Mid/Side mode. When Mid/Side is active, the bar meters will split to show Mid and Side readings instead of left/right. When Mid/Side is active, the main PSR and Program loudness values are still derived from the complete stereo mix, only the bar meters switch to Mid/Side.

9   **True-peak meter.** Measuring dBTP according to ITU-R B.S. 1770, or the Apple afclip algorithm (a variation of B.S. 1770 used in the iTunes specification). The algorithm employed is selected from the settings panel [10]. The numerical value at the top of the meter shows TPmax (maximum true-peak level).

10   **Reset.** Master reset to reset all meter readings.

11   **Settings.** Click to open the settings panel for detailed meter configuration options. See below.

12   **Offset to match.** This control is used to apply an LU (Loudness Unit) offset to the output in order to match the overall program loudness to the chosen target. This is either the target defined on the options panel (or by the preset), or the loudness of the external reference track (if active).

        If 'Offset to match' is active, the level will be boosted or attenuated accordingly, and the amount of offset applied shown on the interface. All meter readings will also be adjusted accordingly.

        The offset applied is a static value (to avoid 'wandering' as the reference or program loudness adjusts). If there is significant drift from target, click the refresh button to re-align with the target value.

        It is recommended that the Offset to Match control is used primarily as an orientation and auditioning facility. Where large offsets are generated, rather than using the offset output, a better approach would be to restructure the gain prior to the MasterCheck plugin, to achieve the desired level.

        If using this control to match audio with very different loudness levels it is possible to generate a large positive correction value, which will cause overload at the output. To avoid distortion downstream it is recommended that an intersample limiter (eg. NUGEN Audio ISL) is inserted to limit the level.

13   **External reference.** This control is used to activate an external reference audio source (side chain input) and is not required during general operation. The external reference is connected to the MasterCheck plug-in using the NUGEN Audio Send plug-in. For details of the NUGEN Audio Send plug-in, please refer to the separate plug-in manual.

        If a SEND plug-in is active, click 'External ref.' to use this a a reference audio source.

        ẟ. If this option is active the main program PLR and program loudness indicators will switch to 'delta' or 'difference' mode, showing the difference in PLR and program loudness between the audio reference and the current program material.

        The speaker control can be used to direct the reference audio through the main output.

Codec Monitoring

MasterCheck Pro provides a real-time audio codec metering and monitoring section. This is accessed through the expanded 'Codec' interface, which can be selected using the option in the settings panel if it is not already active.

1   **Metering and Monitoring.** These controls determine the output metering and monitoring for MasterCheck pro.

      Meter. When Meter is selected MasterCheck pro will meter selected codecs, but will continue to output the native DAW audio ie. The audio output will be at the native DAW/NLE audio resolution and not the audio codec output. This mode allows for a full resolution mixdown to be produced, while continuing to monitor multiple audio compression codecs for clipping.

      Monitor. When Monitor is selected, the audio output is that of the selected real-time codec stream. This control should not be engaged when making an

audio mix-down as many audio compression codecs are highly lossy and can degrade the quality of the original native audio stream significantly.

ᴣ. Use this control to hear the difference between the original audio and the compressed audio stream.

> **Note:**
>
> 1. The delta control is not available when the Ogg Vorbis codec is selected.
>
> 2. The delta can often be seemingly quite large, however as codecs are generally optimised to 'hide' the difference using psychoacoustic techniques, the A|B comparison before and after encoding may be far more acceptable than would initially appear from a first inspection of the audio delta.

2   **Codec selection.** The square check boxes can be used to activate/deactivate each of the 5 codec slots individually. The radio buttons to the right are used monitor the codec output on the main True-Peak meter [3]. The specific details of the active codec are shown below the codec selection panel.

To change the settings of the codec applied in each slot, click the name box to open the codec option panel for that slot.
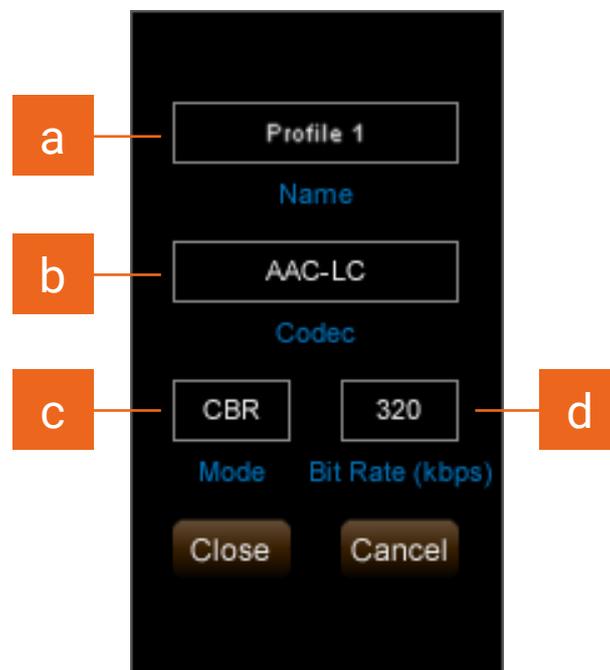
a)   **Codec profile name**. Click to type in a custom tag.

b)   **Codec to be employed.** Click to choose from a drop-down list.

c)   **Mode.** Choose from CBR (Constant bit rate) or VBR (Variable Bit Rate).

d) **Bit rate.** Bit rate. Choose from a drop down list. As VBR encoders choose a flexible bitrate dependent upon the audio in question, if VBR is chosen, the selectable bitrates are approximate.

Note: CBR is not available for the Ogg Vorbis codec.

3-5 **True-Peak meters.** The main True-Peak meter [3], meters the selected output. This can be switched between the native DAW audio (NONE) or any of the active codecs using the radio buttons on the left hand side of the codec selection panel.

> **Note:** It is possible to meter a codec on the main True-Peak meter whilst monitoring (listening to) the native NLE audio. This is determined using the metering and monitoring section [1].

Individual Codec meters. Individual 'mini. codec meters [4] are available for each active codec. These can be switched globally using the mini meter control [5].

A note about codecs and looping audio.

Audio codecs deal with audio in blocks of data. The data in these blocks is then processed and a data compressed stream is generated. This means that looping audio can in fact provide different data in each block as the loop length is unlikely to be an exact multiple of the data block size. As a result, the maximum level of the audio within looping audio sections may vary as the different block content generates differing data compression responses from the algorithm.

Settings

In addition to a number of presets for typical use, MasterCheck can be customised to specific requirements using a number of options contained in the settings panel.

1   **Colour Splits.** The colour splits can be used to define different zones within the bar meters, to indicate desired targets/out of specification values etc. The split values determine the position of the colour boundaries. Click-drag up and down to change the value or double click to enter a specific value. To change the colours of the sections, click the swatch to open the colour picker window.

2   **External reference source.** The colour splits can be used to define different This shows the name of any connected NUGEN Audio Send plug-in. Click to choose from a drop down list of available options.

> **Tip.** If the plug-in is being used to remove loudness from a signal chain, the circular control can be used to sync the SEND plug-in with the output of MasterCheck so that plug-in latencies are compensated for when bypassing the signal chain. If plug-ins are added/removed from the chain, it may be necessary to refresh the sync.

3   **TP.** Determines the algorithm used to determine the True-peak measurement. Choose from afclip (Apple™) or ITU (ITU-R B.S. 1770).

Auto reset. Resets the PLR, PSR and Program loudness values automatically when playback is stopped and restarted.

Ballistics. Sets meter ballistics to recognised standards. The update rate and time window is as defined in EBU R128, this parameter determines the decay time only and does not affect the maximum values.

4   **Segments.** Determines the number of loudness units represented by each segment on the short-term loudness meter.

Text. Determines the colour of the text on the interface.

Target. Determines the reference target used when using the 'offset to match' feature. ie. It is the target loudness value being aimed for.

5   **Units.** Choose between LKFS (ATSC A/85) or LUFS (EBU R128).

Mode. The MasterCheck interface is available in three different modes.

Meter. Metering without codec encoding, metering and monitoring options.

Compact. Switches to a vertically reduced size suitable for display on smaller screens (eg. laptops). For convenience, the interface will autoresize to compact mode if initially opened on a screen not capable of displaying the full length interface.

Codec (MasterCheck Pro only). Switches to the full interface, including codec encoding, metering and monitoring.

Practical Operation

Mixing/mastering for playout

In the new world of loudness normalised playout, it is important to understand how your music will reach the consumer. If you do not take this into account, there is a good chance that it will not be as you originally intended!

Consumer audio consumption is increasingly being delivered through loudness normalised channels. iTunes Radio™, Spotify™, Windows™ 8 and others all incorporate loudness normalisation, which are designed to ensure that the user receives audio at a consistent level and doesn't have to constantly reach for the volume control from track to track. This has repercussions for the audio producer, your 'hot' master will be effectively turned down automatically at playback - in other words, there is no longer any advantage in 'being louder' than the loudness level as determined by the playout system.

Loudness normalisation means that simply pushing your audio into the master limiter could in fact make your productions seem quieter and 'flat' compared with the competition.

To experience this effect, place a limiter on the master bus and make a heavily compressed traditionally 'loud' mix. Then place MasterCheck after the limiter. There is a good chance that you will now be reading loudness levels around -11 or -12 LKFS if the limiter is working hard. Choose any preset and click 'offset to match'. This is how your audio will actually be heard by the consumer.

There are two points to notice:

a) There is a significant drop in level at playout (6dB or more in extreme cases)

b) The audio now peaks well below 0dBFS

ie. Mastering as hot as possible simply wastes headroom and creates a dull mix that never really gets 'loud'.

Using MasterCheck, it is possible to mix to loudness normalisation targets, and produce dynamic masters that make full use of the available headroom and are not automatically turned down at playout. MasterCheck empowers you to mix with confidence, and preserve your musical intention all the way through the transmission chain.

Mixing/mastering to a specific target

1.   **Place MasterCheck on master bus.**

2.   **Choose a preset and play some audio.**

Mix to get the program loudness for the whole track to match the target.
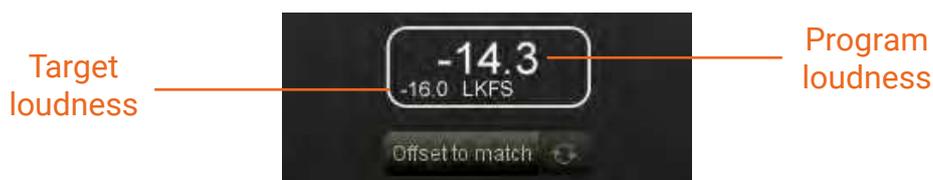
The preset will determine the target loudness for your audio. Different playout situations use slightly different targets (if you have a specific target you would like to mix to, this can be set directly in the settings panel.)

As the audio plays, MasterCheck will measure the Program Loudness. This value is constantly updated and gives a reading for all the audio measured since last reset (by default MasterCheck will reset the meter every time playback is stopped and then restarted).

The Program Loudness for a piece of music is the value acquired by playing the entire piece through the meter from start to finish. This can be thought of as the 'average loudness' for the track, and is the value used by playout systems to achieve a consistent average loudness from track to track.

A note about presets.

At the time of writing, different play-out platforms are using different PLR and loudness targets. These targets are subject to change and in some cases are approximate, as the underlying algorithm can only be deduced by measurement.

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3.   At any point you can use the 'Offset to match' button to automatically match the loudness for your audio to the target. The loudness offset applied is indicated on the interface.

As the program loudness changes, the adjusted value may drift away from the target value. Click the circular refresh button to re-align to target.

4.   **Mix to avoid distortion due to downstream codec conversion.**

Keep the True-peak meter out of the red (or use a True-peak limiter such as NUGEN Audio ISL).

Most streaming services also use some form of data compression (mp3,

AAC etc.) which can introduce distortion into the audio if the level is too high. Truepeak metering is a new form of standardised inter-sample metering defined in ITU-R B.S. 1770 (with a variation to the standard preferred by Apple™ known as afclip) designed to accurately model the analogue waveform to give an accurate indication of the audio levels. To avoid codec conversion distortion, many loudness standards also specify a maximum True-peak level, which is indicated on the True-peak meter for the preset.

5.   **Ease off the compressor!**

Loudness normalisation rewards dynamic mixing.

If you are used to the loudness wars, you may find that the only way to bring your audio in on target is to turn it down on the master bus, which means that the audio now peaks well below the maximum. Try experimenting with less compression to produce a more dynamic mix to make the most of the available headroom, without over compressing - ideally your mix should arrive more or less at target without the need to use the 'Offset to match' facility.

## *Audio Data Compression Codecs (MasterCheck Pro only)*

Most of today's audio streaming services employ data compression techniques to reduce the band width required to deliver audio to the consumer. These codecs generally struggle to cope with transient peaks and can distort unpleasantly when attempting to reconstruct levels in the uncompressed original audio approaching -1dBTP, especially at lower bit rates.

MasterCheck pro allows the monitoring of several codecs simultaneously to simulate different services and listening conditions in order to achieve an acceptable level of distortion for chosen target services.

> **Tip.** Some low quality codecs distort very easily, requiring a True-peak limit several dBTP below the max allowable for the uncompressed signal and other more robust codecs. These codecs are usually employed where the audio stream is targeted at the mobile listener, who may well be in an less well controlled environment with a higher noise floor, and therefore a higher level of clipping may be acceptable in order to preserve transient detail for higher quality streams.

Measuring dynamics

MasterCheck introduces new numerical measures of dynamic content (dynamic range) within audio, the Peak to Loudness Ratio (PLR) and the Peak to Short-term Loudness Ratio (PSR). MasterCheck provides both a PSR bar meter, showing the dynamic content of the audio at playback, and an integrated program measure, PLR, shown at the top of the PSR bar meter.
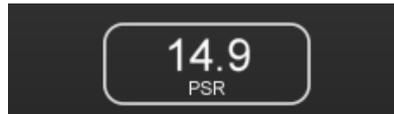
The PLR value is the 'Peak to Loudness Ratio' and is a measure of the dynamics within the audio. The PLR for a piece of music is the value acquired by playing the entire piece through the meter from start to fnish is known as the Program PLR, as shown at the top of the PSR bar meter). The value obtained by playing sections of music is also of interest, giving an indicator of the dynamics within that section. The PSR is the 'Peak to Short-term Loudness Ratio' and uses the Short-term loudness, which calculates the loudness over the last 3 seconds of audio, and the True-Peak. The PSR meter gives an ongoing readout of the PSR at playback.

In a loudness normalised playback situation, over-compression achieves nothing (except a flat mix). Over-compression damages the transient peaks in a recording, leading to a mix that sounds less detailed and 'flat'. As loudness normalised playout systems 'undo' the effect of increased loudness beyond that target loudness value, other perceived gains are lost, so the main question becomes one of taste and audio quality. The PLR meter can be used to assess the dynamics of your audio and objectively compare this with reference tracks. PLR values are genre specifc to some extent, however a PLR range of 8 - 15 would be a reasonable rule of thumb for a healthy dynamic mix.

MasterCheck can also be used in Mid/Side mode to examine the Mid/Side relationship of the PLR values when using Mid/Side compression techniques.

Creating an open and dynamic mix can now lead to a track standing out from the competition. As it is no longer possible to be 'the loudest', other solutions to gain listener attention and interest must be explored.

Comparing to reference material

MasterCheck can also be used to compare your tracks to reference material in order to measure the differences in loudness, PLR and true peak readings.

1. **Place send plug-in on reference track**

   The NUGEN Audio SEND plug-in is installed with MasterCheck and should be available in your plug-ins folder. The SEND plug-in is used to 'tap' the audio at any point in the signal flow in your DAW and send the audio through the MasterCheck.

   To make a comparison between your audio and a reference track, create an audio track with your reference audio and insert the SEND plug-in in this track.

2. **Click External ref.**

   Reference PSR

   Reference loudness

   Place MasterCheck as you usually would to monitor your mix and click the 'External ref.' button. If you are using more than one NUGEN Audio SEND plug-in in your mix, you may need to open the settings panel and select the correct source from the drop down menu.

   MasterCheck will now replace the target loudness value in the bottom left with the loudness measurement from the reference track. The PSR of the reference track will also be shown in the PSR window.

   You can monitor the reference audio by clicking the speaker button.

3.   **[Option] Click the ʒ button to show PSR and loudness the difference.**

Reference ————————————— 4.2 / 11.1 PSR 15.3 ————————————— Your track

—————————————— -1.2 / -13.7 LU -14.9 ————————————— Difference

4.   **[Option] Click 'Offset to match' to hear your audio matched to source.**

If you wish, you can use the 'Offset to match' control to match the loudness of your material to the reference audio. As these values are constantly updated, there may well be some drift over time. Use the circular refresh button to recalibrate if required.

5.   **Examine difference between PSR and loudness**

You can now use the meters to examine the differences in PSR, loudness and true-peak readings and adjust compression/limiting to taste.

Removing loudness from an FX chain

Using MasterCheck to remove loudness from an FX chain can be a very useful technique to employ when trying to evaluate the effect of processing without being influenced by the 'feel good factor' of increased loudness.

Generally speaking, if you turn up some audio, it sounds better. This can be problematic when attempting to make an objective assessment of any form of processing that affects the loudness (eg. a compressor or limiter), because the loudness increase alone will make things sound better. MasterCheck can be used to 'remove' the loudness difference by matching loudness before and after effects, so the effect without loudness can be auditioned, making it much easier to assess the contribution of the processing involved.

The process is very similar to comparing your audio to reference material (see above) except we are now comparing with the same track, before and after processing.

1. Place MasterCheck at end of plug-in chain.

2. Place send plug-in at start of chain (check 'Audio Thru' in SEND plug-in).

    It is important to check the 'Audio Thru' box in the SEND plug-in to allow the audio to pass through the signal chain. By default this is unchecked.

3. Play audio and click 'Offset to match' to remove loudness differential.

4. Use the speaker control to A/B before and after.

    You can now toggle before and after the FX chain using the speaker control.

    Note: If the FX chain contains plug-ins that introduce latency (eg. FFT based EQ or Impulse reverbs etc.), there may be a noticeable delay in the signal chain. If this is the case, you can remove this by syncing the SEND and MasterCheck by clicking the circular 'sync' control in the settings menu.

Click to sync MasterCheck with SEND plug-in to remove delays caused by plug-in Latencies FX chain.

Dialogue clarity - Podcast / Audio for video / post–production

MasterCheck has several applications beyond music production, particularly in the arena of dialogue intelligibility.

### Playout environment – background noise/reduced PLR

With much of today's audio being delivered to mobile devices, the high dynamic range of a typical podcast or talk radio program may in fact be too wide for dialogue intelligibility. This means that the consumer is constantly reaching for the volume control to boost quiet sections, and then experiences discomfort in the louder sections. In extreme cases, it may not even be possible to boost the level of the audio enough on the consumer playback device to make the dialogue intelligible.

As a rule of thumb, this can be avoided by keeping the PLR below 16.

Dialog clarity and background music/FX

Another common source of consumer complaint is a lack of dialogue clarity due to the background music and FX being too loud. This simple mistake can occur due to the fact that many consumer playback systems are simply of too low a quality to replicate what sounded perfectly clear in the post-production studio. Specifying a minimum rule of thumb for dialogue vs background loudness separation can assist in accidental errors of this kind.

MasterCheck can be used to automatically monitor the relative loudness of the Dialog bus relative to the M&E bus using the SEND plug-in and the ⌷ control to make sure that there is always a loudness differential high enough to maintain dialog clarity.
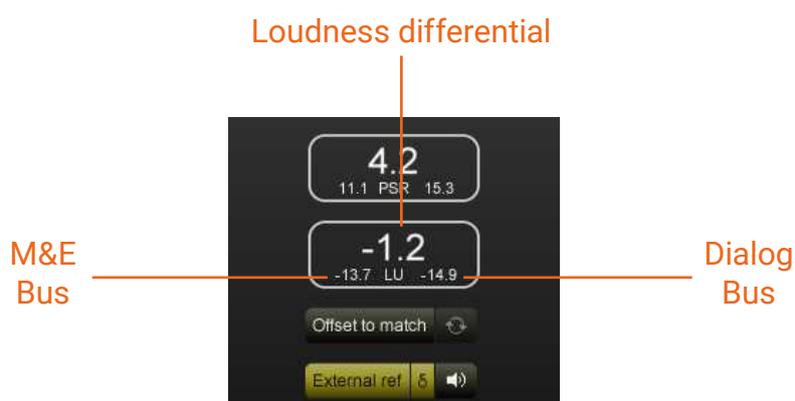
Reporting a Problem

If you encounter a problem with any of NUGEN Audio's products, please let us know, to help us improve them.

Please email NUGEN Audio at **support@nugenaudio.com** giving a clear explanation of the problem. Please state how frequently you've experienced the problem. If there are any particular steps you need to go through to see the problem, please detail these.

Please also state your operating system, and the rough specs for your machine (e.g.- CPU speed, RAM) - in Windows XP you can get this information by rightclicking "My Computer" and selecting properties.

Please be patient with any problems you may experience, particularly with products at a beta stage of release. At NUGEN Audio we take problems with our software seriously, and will endeavour to correct them as quickly as possible.

Version History

1.0   Initial release

1.1   New presets added Compact/
         Laptop mode added

1.2   MasterCheck Pro released

1.4   FLAC and Opus codecs added

1.7   MP3 codec added

1.7   MP3 codec added

1.7.1   Fixed support for running in Mac OS Catalina and above
         Removed VST2, RTAS, and 32-bit versions
         Updated YouTube preset

Notes:

AAX, VST and AU are VST are registered trademarks of their respective owners.

This software uses libraries from the FFmpeg project and encoding technology by Mp3Dev.org.

Appendix 1 – Codec notes

Codec	Samplerates**	Sample formats
FLAC*	1 Hz to 65,535 Hz	signed 16 bit integer
		signed 32 bit integer
AAC	8000 Hz	signed 16 bit integer
	11025 Hz	
	12000 Hz	
	16000 Hz	
	22050 Hz	
	24000 Hz	
	3200 Hz	
	44100 Hz	
	48000 Hz	
	64000 Hz	
	88200 Hz	
	96000 Hz	
Opus	8000 Hz	signed 16 bit integer
	12000 Hz	float
	16000 Hz	
	24000 Hz	
	48000 Hz	
Vorbis	Any	float
MP3	32000 Hz	signed 16 bit integer
	44100 Hz	
	48000 Hz	

*FLAC is a lossless codec, however, the FLAC bitstream uses integers and so can only process integer based audio.

**If a sample rate is not supported by the codec, MasterCheck Pro will re-sample to the nearest appropriate supported sample rate eg. The Opus codec does not support the 44.1 kHz sample rate so MasterCheck Pro wil re-sample to 48 kHz.

As DAWs and plug-ins represent audio in a floating point format, MasterCheck internally performs a conversion of the audio into integer representation so it can be encoded as a FLAC stream, as would be the case when exported from the DAW and prepared as a FLAC stream externally. This quantisation process is not to be guaranteed lossless.

MasterCheck provides two options for the previewing the FLAC encoding, to use either signed 16-bit integers, or signed 32 bit integers. This can be toggled using the 'quality' setting in the codec options.

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