

NULLIFY

Plugin User Manual

Version 2.0.0, MuseHub edition

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This manual covers the NULLIFY plugin (AU and VST3) as sold on MuseHub.

1. What NULLIFY does

Most streams throw part of your master away. Unless a listener has switched on a lossless setting, Spotify and Apple Music play a lossy re-encode of what you upload, and with loudness normalisation on they also turn your track up or down to match a loudness target. Those listeners do not hear the file you exported. They hear the version that survived the codec.

NULLIFY lets you hear that version before you upload, and it lets you hear exactly what was removed.

The method is a null test. NULLIFY takes your audio, runs it through the same kind of encoder the platform uses, decodes it back to plain audio, and lines the result up sample for sample with the original. Then it subtracts one from the other. What is left is the difference signal, or the null: everything the codec changed. If the codec did nothing, the null would be silence. With a real codec it is never silence. It is a quiet, strange version of your track made only of the parts that were thrown away or smeared.

Three things to listen to, on the same transport position, with the same input gain:

- **ORIGINAL:** your audio, trimmed toward -14 LUFS while AUTO -14 LUFS is on (the default).
- **CODEC:** your audio after the codec, level matched the same way. The button is renamed after the tier you pick, for example SPOTIFY PREMIUM or APPLE MUSIC.
- **DIFFERENCE:** original minus codec. The null. Turn up DIFF GAIN to hear it clearly.

NULLIFY is an AU and VST3 plugin. It does all of this live, on a track or bus in your DAW, while the song plays. It encodes in real time, delays the dry signal to match, and reports the delay to the DAW so the null lines up.

NULLIFY does not change your files. It never writes an output file. It is a listening tool. When you have heard what the codec does, you make your own decisions in your own session.

2. Installing

2.1 Mac (AU and VST3)

MuseHub downloads and runs the installer package for you. One package installs both formats, and it is a universal build that runs on Apple Silicon and Intel Macs. It needs macOS 12 or later.

The installer puts the files here:

- `/Library/Audio/Plug-Ins/Components/NULLIFY.component` (Audio Unit, for Logic Pro, GarageBand and other AU hosts)
- `/Library/Audio/Plug-Ins/VST3/NULLIFY.vst3` (VST3, for Ableton Live, FL Studio, Cubase, Reaper and other VST3 hosts)

After installing, open your DAW and let it scan for new plugins. If your DAW was already open, quit and reopen it, or run its plugin rescan. NULLIFY appears under the maker name Boomer Hotel. Logic Pro loads only the AU. Ableton Live can load either.

First open: insert NULLIFY on a track or on the master bus, press play, and the panel starts reading. Nothing to activate, nothing to enter. The status line at the bottom of the window shows the current tier and its latency.

2.2 Windows (VST3)

Windows gets the VST3 format only. There is no AU on Windows because AU is a Mac-only format. The build is 64-bit (x64) and needs Windows 10 or later.

The installer puts the plugin here:

- `C:\Program Files\Common Files\VST3\NULLIFY.vst3`

It also adds an entry called NULLIFY VST3 to Windows Settings > Apps, which is how you remove it later. After installing, rescan plugins in your DAW and look for NULLIFY under Boomer Hotel.

Note for Windows: the Apple Music tiers in the tier menu are labelled "(Mac only)". They use Apple's own AAC encoder, which exists only on macOS. See section 8.4.

3. The plugin, control by control

The plugin window is a fixed 860 by 660 pixels. From top to bottom:

3.1 The wordmark and the subtitle line

Under the NULLIFY wordmark there is one line of white text, for example `SPOTIFY PREMIUM | 91.4 ms`. The first part is the short name of the current tier. The second part is the latency the current codec adds, in milliseconds, at your session's sample rate. The number in the example is only an example.

3.2 The glass box (input meter)

The glass panel is a live meter of the input, drawn as a scrolling history of the input peak level, sampled 12 times a second, covering about the last 18 seconds. It shows what is going into the plugin, before any trim. It is not a file waveform and it is not clickable.

3.3 The LCD panel

Four rows of readouts. All of them are running measurements that settle as the song plays.

Row	What it shows
LOUDNESS	Integrated loudness of the raw input in LUFS (BS.1770, gated). It starts at "--" and settles toward the track's true value the longer you play. It is a running average of everything this instance has heard, so the first few seconds are not the final number.
AUTO GAIN	The gain being applied to the input right now, in dB. With AUTO -14 LUFS on, it is the distance from the running loudness to -14 LUFS, limited to plus or minus 24 dB. With AUTO off, it shows the Manual Trim value.
NULL DEPTH	Level of the difference signal (original minus codec) in dBFS, measured on the left channel per block. It rises at once and falls slowly, so the number is readable and sits near the loudest recent null. Lower (more negative) means the codec changed less. It is measured before DIFF GAIN, so the knob does not change it. It shows "--" until audio has passed through.
LATENCY	The delay the current codec adds, in milliseconds. The same delay is applied to the dry path inside the plugin and is reported to your DAW for delay compensation.

3.4 The three monitor buttons

Three glass buttons in a row. The lit one is what you hear. Switching is smoothed over about 10 milliseconds so there is no click.

Button	What you hear
ORIGINAL	Your input, after the input gain (auto or manual), delayed by the codec latency so it stays in time with the other two.

SPOTIFY PREMIUM / SPOTIFY HIGH / SPOTIFY NORMAL / APPLE MUSIC / APPLE 128	The middle button. Its label follows the tier you picked. What you hear is the input after the codec (encode, then decode), at the same gain.
DIFFERENCE	Original minus codec, multiplied by DIFF GAIN. The null.

In your DAW's automation list these three states are one parameter called **Monitor** with the values Input, Codec and Difference. A new instance starts on ORIGINAL.

3.5 The tier menu

A drop-down list of the codec tiers. Its automation name is **Codec Tier**. The plugin has five tiers:

1. Spotify Very High (Premium) - Ogg Vorbis 320 kbps
2. Spotify High - Ogg Vorbis 160 kbps
3. Spotify Normal - Ogg Vorbis 96 kbps
4. Apple Music - AAC 256 kbps (Apple's own encoder)
5. Apple Music - AAC 128 kbps

The first tier is the default. On Windows the two Apple Music entries carry the suffix "(Mac only)". Changing the tier rebuilds the codec. Audio is briefly suspended while that happens and the latency is re-measured and re-reported to the DAW, so expect a short interruption. Section 5 explains each tier.

3.6 DIFF GAIN

The brushed-metal knob. Drag it up or down. Range 0 to +40 dB in 0.1 dB steps, default 0 dB. Its readout, "+X.X dB", sits under the knob with the label DIFF GAIN. It only affects the DIFFERENCE button. The null is quiet by nature, so this is how you bring it up to a listening level. It does not touch ORIGINAL or the codec button. Automation name: **Diff Gain**.

The plugin never outputs anything above full scale (0 dBFS); anything louder is clipped. If a loud null distorts at high DIFF GAIN, turn the knob down. A quiet, peaky master that AUTO -14 LUFS turns up a long way can also reach that point; if you hear distortion on ORIGINAL or the codec button, turn AUTO off and use Manual Trim.

3.7 AUTO -14 LUFS

A tick box, on by default. When on, the plugin measures the input's running loudness and applies a gain that moves it toward -14 LUFS, clamped to plus or minus 24 dB. The gain is smoothed over a quarter of a second so it never jumps. Because the loudness measurement is a running one, the trim settles in the first seconds of playback. The same gain feeds both the dry path and the codec path, so ORIGINAL and the codec version stay level matched. Automation name: **Auto -14 LUFS**.

The plugin trims toward -14 LUFS for every tier, including the Apple Music tiers. See section 6.

3.8 Manual Trim

A horizontal slider with a number box, range -24 to +24 dB in 0.1 dB steps, default 0 dB. It is the input gain used when AUTO -14 LUFS is off. When AUTO is on, the slider is still on screen and still movable, but the auto gain overrides it. Automation name: **Manual Trim**.

3.9 Status line and credit line

The status line at the bottom reads, for example, Spotify Very High (Premium) - Ogg Vorbis 320 kbps | latency N smp (X ms), where N is the delay in samples and X the same delay in milliseconds. It changes to a plain sentence when something needs your attention:

- Initialising... The codec has not started yet. Press play. See section 8.9.
- This tier needs macOS (Apple's AAC encoder). Pick a Vorbis tier. You picked an Apple Music tier on Windows. Audio passes through without the codec (the input trim still applies) and the null is silent.
- Codec failed: Apple AAC needs a 48 kHz or lower session. Use a Vorbis tier, or run your session at 44.1/48 kHz. Your session is above 48 kHz.
- Codec failed: Vorbis encoder rejected this sample rate / bitrate. The Vorbis encoder could not start at your session rate.
- Codec error: ... The codec stopped mid-stream. Audio passes through until the codec restarts: pick a different tier and then the one you want, or remove and re-insert the plugin.

The very last line reads NULLIFY v2.0.0 - BOOMER HOTEL LLC - MADE IN NYC BY TONY/TRASH. The version is printed there on purpose, so you can tell support which build you have.

3.10 What the plugin saves

The five parameters (Codec Tier, Monitor, Diff Gain, Auto -14 LUFS, Manual Trim) are saved with your DAW project like any other plugin settings. The plugin writes no files of its own. Input and output are mono or stereo, and the output layout must match the input.

4. Monitor modes in one place

The plugin has exactly three listening states. The names differ slightly between the window and the automation list.

Button (window)	Parameter value (automation)	Signal
ORIGINAL	Input	Input after loudness gain, delayed to match the codec.
Tier name (SPOTIFY PREMIUM, SPOTIFY HIGH, SPOTIFY NORMAL, APPLE MUSIC, APPLE 128)	Codec	Input after loudness gain, encoded and decoded by the tier's codec.
DIFFERENCE	Difference	ORIGINAL minus codec, times DIFF GAIN.

ORIGINAL and the codec version are level matched by construction: the same gain is applied before the codec, and the dry path is delayed by exactly the codec's latency. What changes between those two buttons is only what the codec did. DIFFERENCE is the gap between them, raised by DIFF GAIN.

5. The tiers explained

The tier label is exactly what the menu shows. "Emulates" says what the tier is standing in for.

Tier label (as shown)	Codec	Bitrate	Emulates	Mac only	Notes
Spotify Very High (Premium) - Ogg Vorbis 320 kbps	Ogg Vorbis (libvorbis, managed bitrate)	320 kbps nominal	Spotify Premium, Very High	No	Spotify's published tier.
Spotify High - Ogg Vorbis 160 kbps	Ogg Vorbis	160 kbps nominal	Spotify High (top setting on Free)	No	Same.
Spotify Normal - Ogg Vorbis 96 kbps	Ogg Vorbis	96 kbps nominal	Spotify Normal	No	Same.
Apple Music - AAC 256 kbps (Apple's own encoder)	AAC-LC, Apple AudioToolbox	256 kbps	Apple Music	Yes	Real Apple encoder. Session must be 48 kHz or lower.
Apple Music - AAC 128 kbps	AAC-LC, Apple AudioToolbox	128 kbps	Apple Music at a lower rate	Yes	Real Apple encoder at 128 kbps, for hearing Apple's codec at a lower rate. Session must be 48 kHz or lower.

The plugin carries only the two codecs that run live inside it: Ogg Vorbis and Apple's AAC. It has no YouTube, SoundCloud, TikTok or Instagram tiers.

5.1 One warning about reading the null

NULLIFY's own measurements show that a wrong encoder, a wrong bitrate and a wrong resampler all leave a null of roughly -29 dB peak against the real platform stream. So when an emulation is only close, the null does not tell you which thing is off. What the null does tell you reliably is what this codec at this bitrate does to your music. That is the question NULLIFY is built to answer.

6. Loudness

Most platforms do not play your file at the level you exported. They measure its loudness and apply a gain so that everything sits near one target. NULLIFY does the same thing before it encodes, so that the codec is working on a signal at a normalised level, and so that ORIGINAL and the codec version sit at the same level when you compare them.

6.1 What the plugin does

Setting	Gain before the codec
AUTO -14 LUFS on (default), any tier	Gain toward -14 LUFS, up or down, limited to plus or minus 24 dB. Gain only, never a limiter. The same target is used for the Spotify tiers and the Apple Music tiers.
AUTO -14 LUFS off	Manual Trim, -24 to +24 dB. Set it to 0 dB to hear your audio at its own level.

The loudness is a running measurement of the input, and the trim follows it, smoothed. It settles over the first seconds of playback. Play the song from the start for the most accurate reading. The measurement keeps averaging everything this instance has heard, including earlier passes and other material you played through it, and it only starts again when the DAW re-prepares the plugin, for example when you remove and re-insert it. Silence is ignored.

Two places where NULLIFY differs from the platforms. Apple's Sound Check targets about -16 LUFS, while the plugin uses -14 LUFS for every tier, so all tiers are compared at one level. And NULLIFY also brings a quiet master up to the target, which Apple's Sound Check is described as not doing. That is deliberate. It keeps ORIGINAL and the codec version level matched so you can compare them. It also means a very quiet master will sound louder in NULLIFY than it will on Apple Music.

6.2 Why a louder master does not win

If a platform normalises, a master at -8 LUFS and a master at -14 LUFS end up playing at the same volume. The louder one has simply been turned down by 6 dB, and it arrives with less dynamic range and, often, more codec damage, because limiting pushes energy into the places the codec is worst at. NULLIFY makes this audible: with AUTO -14 LUFS on, a loud master and a quieter one both sit at the target, so the only thing left to hear is the damage.

The AUTO GAIN row confirms what happened. A reading of -6.0 dB means your master is about 6 dB louder than -14 LUFS and is being turned down by that much.

7. Six short workflows

Before any of these, make sure your DAW's plugin delay compensation is on.

7.1 Checking a master before upload

1. Put NULLIFY last on the master bus, after your limiter and anything else on the bus.
2. Pick the tier for the platform you are uploading to. Spotify Very High is the default.
3. Play the whole song from the start. LOUDNESS and AUTO GAIN settle over the first seconds.
4. Press the codec button (SPOTIFY PREMIUM, APPLE MUSIC and so on). Listen to the whole chorus.
5. Flip between ORIGINAL and the codec button in the same bar. They are level matched, so what you hear is only the codec.
6. Read NULL DEPTH after a phrase or two. Then move to workflow 7.2 to hear the damage on its own.
7. Remove or bypass NULLIFY before you export your master. Anything on the master bus ends up in the export, including NULLIFY's loudness trim.

7.2 Hearing only what the codec removes

1. With NULLIFY on a playing track or bus, press **DIFFERENCE**.
2. Turn **DIFF GAIN** up until the null is at a comfortable listening level. The knob goes to +40 dB.
3. What you hear is what the listener will not. Hiss and sparkle at the top is normal. A clear melody, a clear vocal, or a clear kick in the null means the codec is changing something that matters.
4. Turn DIFF GAIN back down before switching to ORIGINAL. DIFF GAIN does not affect the other two buttons, but your ears will thank you.

7.3 Comparing two tiers

1. Loop a section of the song in your DAW and let it play with NULLIFY on the master bus.
2. Let NULL DEPTH settle and note the number.
3. Change the tier menu while the loop plays. The codec rebuilds and the latency is re-reported, so there is a short gap. The loudness measurement is not reset by a tier change, so AUTO GAIN stays where it was.
4. Give NULL DEPTH a few seconds to settle and note the new number. A more negative number means less damage.
5. Listen on DIFFERENCE at the same DIFF GAIN for both tiers. The louder null is the more damaged one.

7.4 Checking a low-end problem

1. Loop the section with the problem in your DAW, with NULLIFY last on the master bus.
2. Press DIFFERENCE and raise DIFF GAIN. Listen for the kick and the bass in the null. If they are plainly there, the codec is reshaping the low end.
3. Try the lowest tier you care about: Spotify Normal at 96 kbps, or Apple Music - AAC 128 kbps on a Mac.
4. Adjust your mix while the loop plays. NULLIFY works live, so you hear the effect of each change on the null straight away.

7.5 Checking a stereo problem

1. Press DIFFERENCE and raise DIFF GAIN. Listen to whether the null is mostly the wide elements (reverb tails, wide synths, stereo effects). Codecs at low bitrates spend fewer bits on the sides.
2. Compare Spotify Normal (96 kbps) with Spotify Very High (320 kbps) on the same loop. If the wide elements get much louder in the null at the lower rate, your mix leans on stereo detail the lower tiers cannot keep.
3. Flip between ORIGINAL and the codec button on headphones. If the image moves, that is what your listener gets.

7.6 Checking several finished masters

NULLIFY has no file browser. Your DAW plays the files and NULLIFY listens to them.

1. Open an empty project at 44.1 or 48 kHz.
2. Make one audio track per file and drop each finished master onto its own track, starting at the same bar.
3. Insert NULLIFY on every track and set the same tier on each. Use one instance per file. The LOUDNESS reading averages everything an instance has heard, so two songs through one instance give a mixed reading.
4. Leave AUTO -14 LUFS on. It brings every file to the same loudness, which makes the NULL DEPTH numbers comparable between files.
5. Solo the first track, play the whole file, and write down the file name and NULL DEPTH. Solo the next track and repeat.
6. Files with a noticeably higher (less negative) NULL DEPTH than the rest of the set are the ones to listen to properly on DIFFERENCE.

8. Questions and problems

8.1 The DIFFERENCE is not silent. Is something wrong?

No. A lossy codec removes information by definition, and the null is that information. With a real codec the null is never silence. What matters is how loud it is (NULL DEPTH) and what it sounds like. A hissy, sparkly null is the normal sound of a codec working. A null with clear musical content is a warning.

If the null seems far too loud, check three things. First, DIFF GAIN: at +40 dB even a good null is loud. Second, that your DAW's plugin delay compensation is on. Third, that you gave the running loudness a few seconds to settle.

8.2 Phase and latency

The codec takes time. NULLIFY delays the dry signal by exactly the same amount inside the plugin, so the three monitor buttons are always in time with each other. It also reports that delay to the DAW, so the DAW can shift everything else to keep the whole session in time. The LATENCY row shows the amount. It changes when you change tier or sample rate, and the DAW is told each time. If your DAW does not compensate, the NULLIFY track will play late by the LATENCY amount relative to other tracks. That does not affect the null, which is computed inside the plugin.

8.3 Sample rates

Apple's AAC encoder needs 48 kHz or lower. On a Mac, an Apple Music tier in a 96 kHz session shows "Codec failed" in the status line and passes audio through. Switch to a Vorbis tier, or run the session at 44.1 or 48 kHz.

If the status line says `Codec failed: Vorbis encoder rejected this sample rate / bitrate.`, the Vorbis encoder could not start at your session rate. Run the session at 44.1 or 48 kHz. Audio passes through until the codec starts.

8.4 Apple Music tiers on Windows

The Apple Music tiers use Apple's own AAC encoder, which exists only on macOS. In the Windows plugin they are labelled "(Mac only)". If you select one, the status line says `This tier needs macOS (Apple's AAC encoder). Pick a Vorbis tier.`, audio passes through without the codec (the input trim still applies), and the null is silent. The three Spotify tiers run fully on Windows.

8.5 Where are files written?

Nowhere. The plugin writes no files. Its settings live inside your DAW project. The one thing to remember: if you leave NULLIFY on the master bus when you export, its output is part of your export. Bypass it first.

8.6 Uninstalling

- **Mac.** Use the MuseHub Library tab, or delete `/Library/Audio/Plug-Ins/Components/NULLIFY.component` and `/Library/Audio/Plug-Ins/VST3/NULLIFY.vst3` and restart the DAW. There is no licence file in this edition.
- **Windows.** Windows Settings > Apps > NULLIFY VST3, or the MuseHub Library tab.

Leftovers from an old boomerhotel.com copy (`~/Library/Application Support/NULLIFY/`, `/Users/Shared/NULLIFY/`, or `%APPDATA%\NULLIFY\` on Windows) are ignored by the MuseHub edition and can be left or deleted.

8.7 The numbers keep moving

They are supposed to. LOUDNESS is a running integrated measurement, AUTO GAIN follows it, and NULL DEPTH is a smoothed block reading. All three settle toward the track's true values over the first seconds of playback. Read them after a phrase or two, not at the first beat.

8.8 LOUDNESS still shows the last song, or has stopped moving

One instance averages everything it has heard since the DAW last prepared it. If you played a different song through the same instance, the reading mixes both. Remove and re-insert NULLIFY to start a fresh measurement, or use one instance per song.

One instance also keeps about 109 minutes of loudness history. After that, LOUDNESS and AUTO GAIN stop updating. Some DAWs keep plugins running while the transport is stopped, so a long session can reach this. Remove and re-insert the plugin to start again.

8.9 The plugin shows "Initialising..."

The codec has not been started yet. It starts when the DAW prepares the plugin for playback. Press play. If it stays, remove and re-insert the plugin.

8.10 Which Spotify tier should I use?

Spotify describes Very High (about 320 kbps) as Premium only, and High (about 160 kbps) is the top setting on Free. Normal (about 96 kbps) is a lower setting. Most producers check High and Very High.

8.11 Is there a YouTube, SoundCloud or TikTok tier?

No. The plugin has five tiers: three Spotify tiers (Ogg Vorbis) and two Apple Music tiers (AAC). Those are the two codecs it can run live inside your DAW.

9. Requirements and versions

System	Formats	Minimum	Notes
Mac	AU and VST3, one universal build (Apple Silicon and Intel)	macOS 12 or later	Logic Pro and GarageBand use the AU. Ableton Live, FL Studio and Reaper use the VST3 or the AU. Cubase uses the VST3. Logic cannot load VST3.
Windows	VST3 only, 64-bit x64	Windows 10 or later	No AU on Windows. The Apple Music tiers are Mac only.

Version covered by this manual: **2.0.0**. The plugin prints its version on the bottom line of its window. Mono or stereo input. Apple Music tiers need a session at 48 kHz or lower.

10. MuseHub edition notes

Bought on MuseHub? Update only through MuseHub. Do not install the boomerhotel.com edition over it.

The two editions install to the same locations under the same name and bundle identifier, so each one replaces the other. The boomerhotel.com edition expects a Boomer Hotel licence key and runs in demo mode without one: audio dips briefly every 20 seconds and the Apple Music tiers are locked. If you ever see a licence key field, an UNLOCK button, a "Demo mode" line, or a news banner mentioning boomerhotel.com, you are running the boomerhotel.com edition. Reinstall NULLIFY from the MuseHub Library tab.

What the MuseHub edition leaves out, on purpose:

- No licence key and no activation step. There is nothing to unlock.
- No demo limits. No audio dips, no locked tiers.
- No update checker and no news banner. MuseHub handles updates.
- No diagnostics and no privacy switches. There is nothing to switch.

Purchases, refunds, receipts and the number of machines are handled by MuseHub as the seller. Boomer Hotel does not issue keys for the MuseHub edition and cannot see MuseHub orders.

11. Privacy

The MuseHub edition of NULLIFY sends nothing. It never connects to the internet. Your audio, your file names and your projects never leave your computer. There is no account, no identifier, no analytics and no crash reporting.

The Boomer Hotel Privacy Policy on boomerhotel.com describes three network activities in the boomerhotel.com edition: a one-time licence activation, an optional daily check for release news, and optional anonymous diagnostics. None of the three exists in the MuseHub edition. The code for them is compiled out of the plugin, and the build is checked for leftover network strings before it ships.

MuseHub itself handles your purchase and any DRM under its own terms and privacy policy.

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