

WAVES HEQ Hybrid Equalizer



- USER GUIDE -



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Chapter 1 – Introduction

1.1 Welcome

Thank you for choosing Waves. In order to get the most out of your Waves processor, please take some time to read this manual. We also suggest that you become familiar with www.waves.com/support. There you will find an extensive answer base, the latest tech specs, detailed installation guides, new software updates, and current information about registering your products. By signing up at www.waves.com, you will receive personalized information about your registered products, reminders when updates are available, special offers, and more.

1.2 Product Overview

Waves H-EQ is a powerful Hybrid Equalizer that features:

- Vintage and modern equalization curves inspired by the finest British and American consoles
- Seven different filter types per band, including a newly-developed, one-of-a-kind asymmetrical bell filter
- An intuitive keyboard graphic that lets you choose frequencies by clicking on notes
- An exclusive MS matrix mode so you can apply different EQ to M (Mid) and S (Side) content
- A flexible real-time frequency spectrum analyzer with multiple display options
- **New:** The H-EQ Lite components, which require less CPU, are well suited for live sound or when processing resources are limited. The Lite components do not include the Spectrum Analyzer and Analog sections.
- **New:** Any parametric band can be soloed by touching its Cue, Frequency, Q, or Gain controls. This provides a momentary check of a band's processing. For a latching solo of a band, click on its solo button.
- **New:** A Smoothing feature eliminates noises that can occur while moving controls on certain older H-EQ versions. When a session with instances of older H-EQ versions loads, Smooth will automatically set to Off. This eliminates any chance that the smoothing process will affect the original sound. If noises are heard while moving controls, the user can switch Smooth on, but there's a chance that this may slightly alter the sound. By default, new instances of H-EQ in new or old sessions will load with Smooth On.

1.3 Concepts and Terminology

H-EQ has five parametric bands plus high- and low-pass filters, with seven different EQ types available for each band: US Vintage, UK Vintage 1, UK Vintage 2, US Modern, UK Modern, Digital 1 and Digital 2.

Modes

- **Linked/Stereo** – Both left and right channels receive the same EQ processing, as with any stereo EQ.
- **Unlinked/Dual** – Different EQ processing may be applied to the left and right channels.
- **MS Matrix** – An MS matrix is applied which separates the stereo input into M (Mid) and S (Sides), thus enabling you to apply different EQ to the M and S channels. This is helpful in mastering situations where center-panned information may require different EQ processing than side-panned content, or when you need to correct the stereo imaging of sources such as drum overheads.

Analog

The Analog section provides control over the level of harmonics, hum, and noise levels added to the signal. To save DSP, the H-EQ Lite components do not include the Analog section.

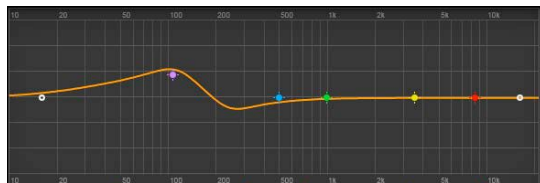
Analyzer

The H-EQ's frequency analyzer presents a real-time graphical display of the input signal, output signal or both, as well as the EQ curve currently applied to the signal. To save DSP, the H-EQ Lite components do not include the Analyzer.

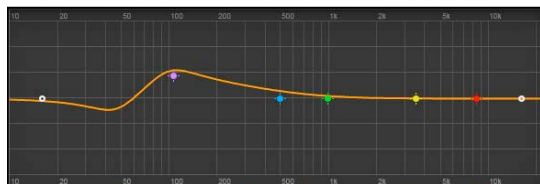
Asymmetrical Filter

H-EQ includes a newly developed, one-of-a-kind asymmetrical bell filter (Digital 1), which we have found ideally suited for creative equalization. It's important to note that the Q for this filter does not change the width of the bell; rather, it controls the “tilt” of the filter. Lower Q values are especially effective on low-frequency signals such as bass, kick drum and piano, while high Q settings work well on high-frequency content such as cymbals, strings, acoustic guitar and vocals.

For example, when the Q is set all the way counterclockwise ($Q=1$), the slope toward the cutoff point is much more gentle than the slope coming down from the cutoff point, which is much steeper, scooping out some of the low-mid frequencies. This creates a very musical bell shape that is ideal for boosting or cutting low frequencies.



When the Q is set all the way clockwise ($Q=100$), it creates a mirrored slope where the left side of the curve rises sharply and scoops out a bit before reaching the cutoff point, with a very gentle slope descending toward the higher frequencies.



Keyboard

The Keyboard is a unique feature of the H-EQ that lets you choose frequencies by clicking on notes. Until now, EQs have been frequency-based, making them easier to use for engineers who are used to manipulating frequencies, but less comfortable for musicians who are accustomed to dealing with notes. For example, many people know that A4 = 440 Hz, but putting this information into practice and building on it while mixing is considerably more complex. This is where the power of the Keyboard comes into play; you can now move comfortably in both musical and engineering terms.

Let's take a look at a couple of examples:

- o You are a musician, and you hear a low E1 that's somewhat out of control coming from the bass guitar. Simply select the LF frequency control, click on E1 on the Keyboard, and the band frequency will snap to 41 Hz = E1. Or, you can grab the blue note (LF marker) on the Keyboard and sweep it down to E1.
- o You are an engineer, and your client (producer or musician) says that when the sampled violins hit F6 it becomes harsh and painful. To turn down the offending notes, select the HMF frequency, click F6 (1397 Hz) on the Keyboard. Presto.

You can also create narrow notches that correspond to specific musical keys, and automate them to produce interesting resonant effects. The Keyboard opens up a new world of creative and experimental EQ possibilities.

1.4 Components

WaveShell technology enables us to split Waves processors into smaller plugins, which we call components. Having a choice of components for a particular processor gives you the flexibility to choose the configuration best suited to your material.

H-EQ has two components:

- H-EQ Mono
- H-EQ Stereo

H-EQ Lite has two components:

- H-EQ Mono
- H-EQ Stereo

The H-EQ Lite components require less CPU than the complete H-EQ. This is useful for live sound applications or when DSP resources are limited. The H-EQ components do not include the Spectrum Analyzer or the Analog section.

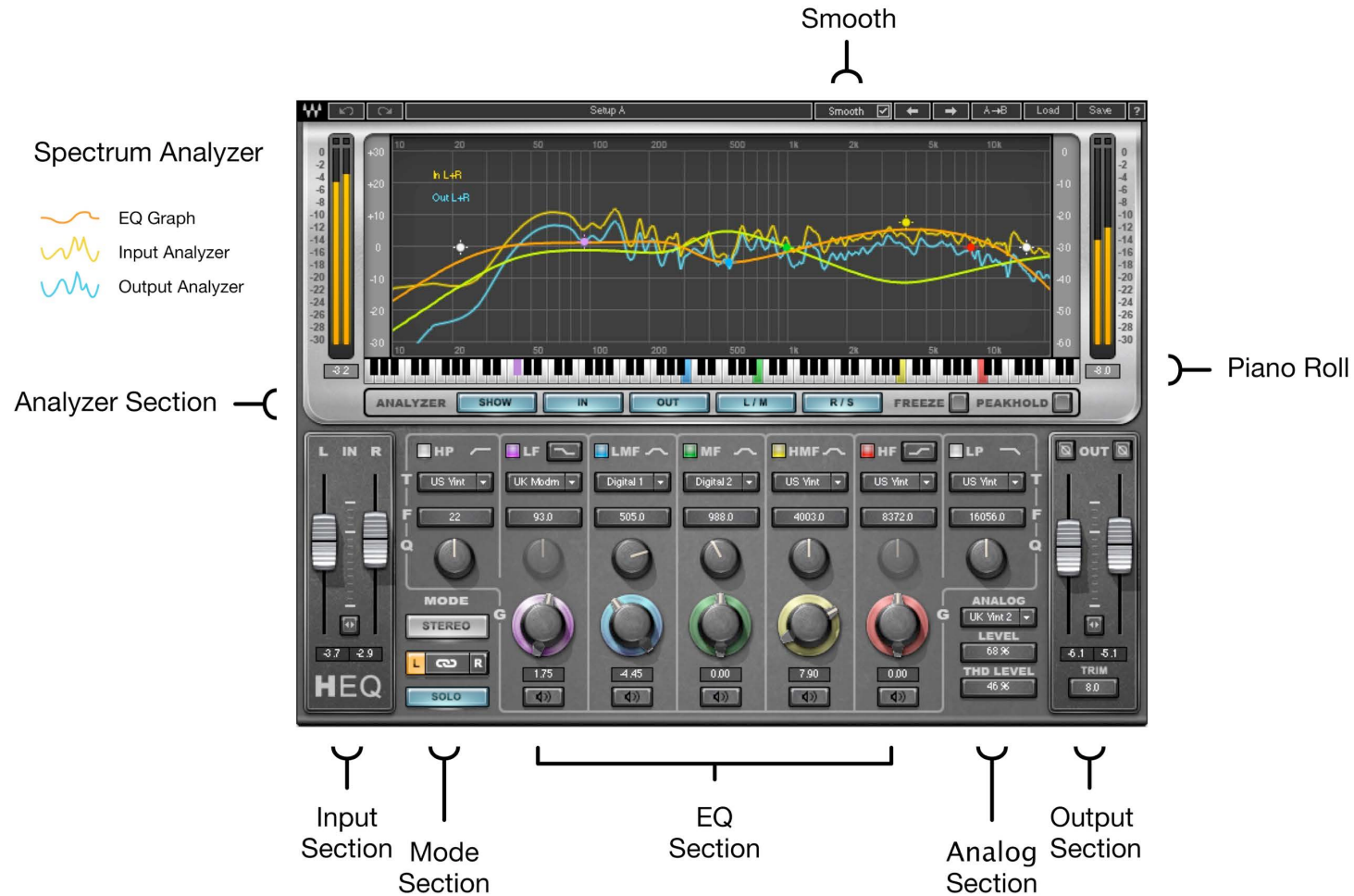
Chapter 2 – Quick Start Guide

- Insert H-EQ on a track. Select a the Full or Lite component.
- Select a Channel Mode: Linked, Unlinked, or MS.
- Select a Filter Type for each band. Toggle between the filter types and pay attention to how they affect the sound. Each has its own unique-sounding curve.
- Adjust the Frequency, Q, and Gain parameters, as you would with any EQ.
- Turn on Analog and toggle between types to find the one that adds the color you find most pleasing for this content.
- Play the song and watch the Analyzer to better understand the frequency spectrum spread.
- Use the Solo function to hear only the band you're currently adjusting. This allows you to focus on and fine-tune your settings.

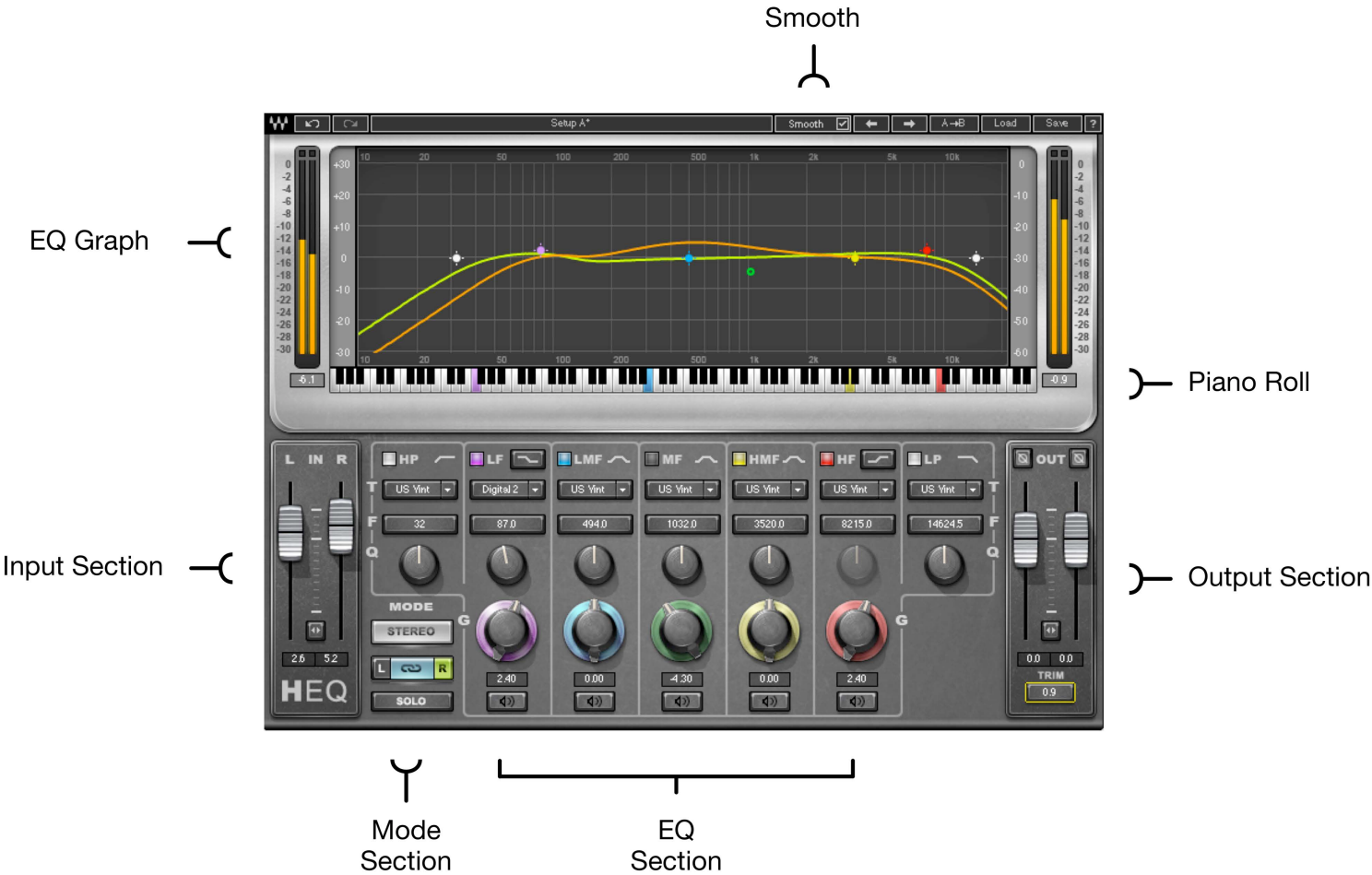
Chapter 3 – Interface and Controls

3.1 H-EQ Interface Overview

H-EQ (Stereo) Component



H-EQ Lite (Stereo) Component



Input Section

Input Fader controls the signal input level.

Range: +12 to -30

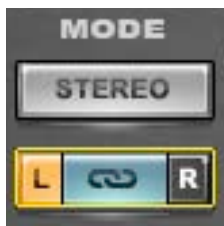
- o In the H-EQ stereo component, separate left and right channel faders are available.
- o In MS mode, the left fader controls the M (Mid) level, while the right fader controls the S (Sides) level.

For more information on MS mode, please see the MS Mode section below.

Full-scale Input Meters are located above the input faders.

EQ Mode Section

Stereo/Linked



In Stereo/Linked mode, both left and right channels receive the same EQ processing, as with any stereo EQ.

Dual/Unlinked



In Dual/Unlinked mode, different EQ processing may be applied to the left and right channels.

- o Input and output faders are unlinked to enable level control for each channel.
- o The small buttons to the left and right of the link control determine which channel is currently affected by the EQ section. When L is selected, only the left channel is affected and represented in the EQ graph by the orange curve; when R is selected, only the right channel is affected and represented by the light green curve.

MS Mode



An MS matrix separates the stereo input into M (Mid) and S (Sides), enabling you to apply different EQ to the M and S channels.

- o The M/Mid channel is represented in the EQ graph by the orange curve; the S/Sides channel is represented by the light green curve.
- o The control beneath the Mode selector becomes a Listen control, represented by a speaker icon. Clicking the speaker icon while M is selected, you will hear the M information coming from both output channels as mono; when S is selected, you will hear the S information coming from both output channels as mono.
- o The buttons to the left and right of the Listen control determine which channel is affected by the EQ section.

Solo (enable)

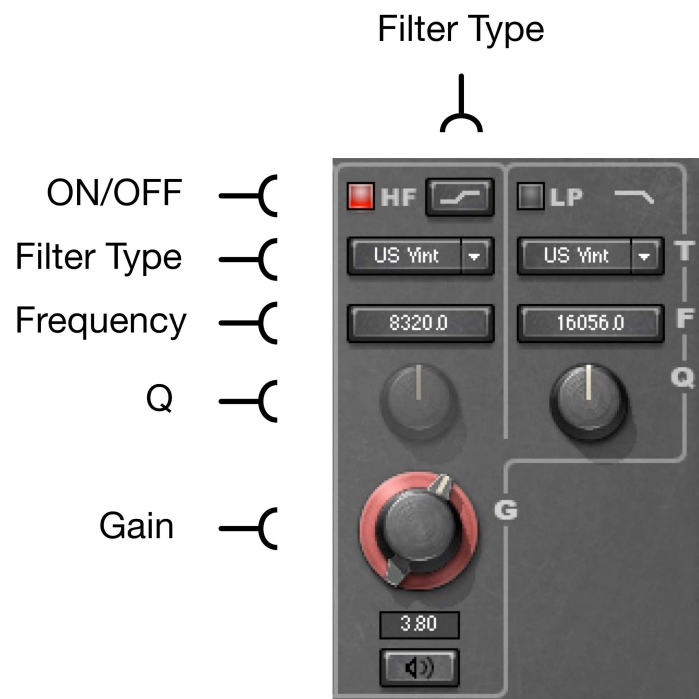


Enables quick activation of Solo mode for a band.

- o When Global Solo is enabled, an EQ band can be put into solo mode by touching or moving its controls. The Solo function can be applied to the LF, LMF, MF, HMF, and HF parametric bands.
- o Solo is momentary when touching the frequency, Q and Gain controls. EQ band solo control behavior is unchanged in this mode: it always provides a locking solo.

EQ Section

There are seven EQ bands. Each has an On/Off switch whose color matches the corresponding band marker in the EQ display. A band can also be toggled on and off by clicking on its Band Marker.



HP – High pass filter

Type Range: US Vintage, UK Vintage 1, UK Vintage 2, US Modern, UK Modern, Digital 1, Digital 2

Frequency Range: 16 Hz–21096 Hz

Q Range: 1–100 (*Not available in UK Vintage 1, UK Vintage 2, US Modern, Digital 1*)

F – Low frequency

Types: US Vintage, UK Vintage 1, UK Vintage 2, US Modern, UK Modern, Digital 1, Digital 2

Shape Range: Shelf/Bell (selected using the toggle control)

Frequency Range: 22–21096 Hz

Q Range (Bell): 1–100 (*Not available in UK Vintage 2, US Modern, UK Modern*)

Q Range (Shelf): 1–100 (*Available only in Digital 1 and Digital 2*)

LMF – Low-mid frequency

Types: US Vintage, UK Vintage 1, UK Vintage 2, US Modern, UK Modern, Digital 1, Digital 2

Shape Range: Bell only

Frequency Range: 22–21096 Hz

Q Range: 1–100 (*Not available in US Modern*)

MF – Mid frequency

Types: US Vintage, UK Vintage 1, UK Vintage 2, US Modern, UK Modern, Digital 1, Digital 2

Shape Range: Bell only

Frequency Range: 22–21096 Hz

Q Range: 1–100 (*Not available in US Modern*)

HMF – High-mid frequency

Types: US Vintage, UK Vintage 1, UK Vintage 2, US Modern, UK Modern, Digital 1, Digital 2

Shape Range: Bell only

Frequency Range: 22–21096 Hz

Q Range: 1–100 (*Not available in US Modern*)

HF – High frequency

Types: US Vintage, UK Vintage 1, UK Vintage 2, US Modern, UK Modern, Digital 1, Digital 2

Shape Range: Shelf/Bell (selected using the toggle control)

Frequency Range: 22–21096 Hz

Q Range (Bell): 1–100 (*Not available in UK Vintage 2, US Modern*)

Q Range (Shelf): 1–100 (*Available in Digital 1 and Digital 2 only*)

LP – Low-pass filter

Types: US Vintage, UK Vintage 2, US Modern, UK Modern, Digital 1, Digital 2 (*UK Vintage 1 not available*)

Frequency Range: 21096–16 Hz

Q Range: 1–100 (*Not available in UK Vintage 2, US Modern, Digital 1*)

Gain: Each parametric band has a Gain control.

Range: +/-18 dB

Solo: Each parametric band has a latching Solo button at the bottom of the EQ band control. This button solos the selected band, which facilitates detailed band-specific adjustment.

Analog Section



Analog toggles between analog characteristic types.

Range: Off, US Vintage, UK Vintage 1, UK Vintage 2, US Modern, UK Modern

Level controls the level of the combined noise and hum: US Vintage = 60 Hz, UK Vintage 1 & 2 = 50 Hz

(Not available in Digital 1, Digital 2; Hum not available in US Modern, UK Modern)

Range: 0–200%

Default: 100%

THD Level controls the level of harmonic distortion added to the signal.

Range: 0–1000%

Default: 100%

The Analog section does not appear in the H-EQ Lite components.

Keyboard Section

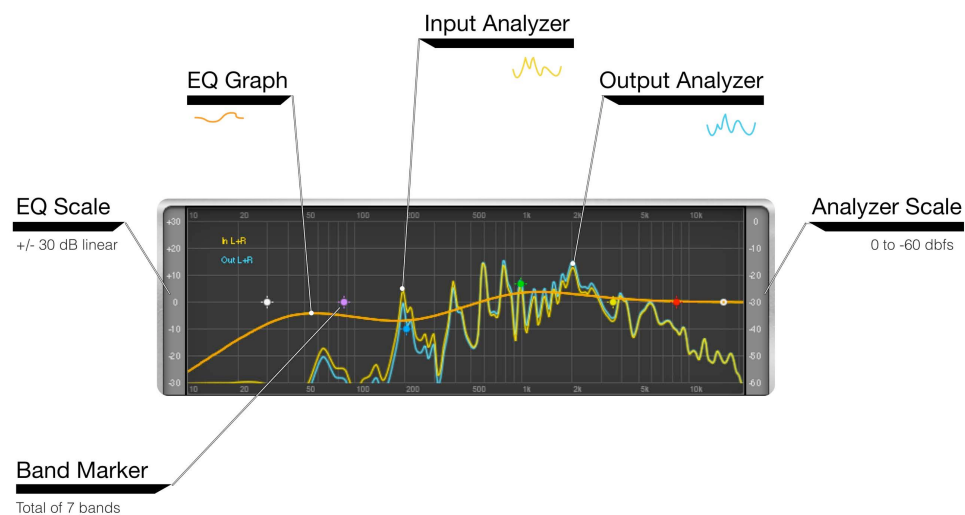
The **Keyboard** lets you choose frequencies by clicking on notes.



Range: F0–E10

For more information, please refer to Section 1.3 above, Concepts and Terminology.

Display Section



The **Analyzer** presents a real-time graphical display of your input signal, output signal, or both, as well as the EQ curve currently applied to your signal.

Please note:

- Turning the Analyzer off or closing the H-EQ graphic interface removes it from your CPU load, thus enabling a greater number of H-EQ instances.
- The Analyzer displays the signal before the Analog section, so any changes caused by the Analog section are not shown here.



Show turns the Analyzer on/off.

In displays the input signal, post-input fader, represented in yellow.

Out displays the output signal, post-output fader, represented in blue.

L/M turns on the display of the left side only in Stereo mode, or the M in M/S mode.

R/S turns on the display of the right side only in Stereo mode, or the S in M/S mode.

Please note: Switching off both L/M and R/S turns the Analyzer off.

Freeze – Clicking the Freeze button stops the frequency graph. To release it and return to real-time graphing, click the button again, or click any other Analyzer control.

Peak Hold – Clicking Peak hold stops the frequency graph at its highest peak point, the maximum measured level.

Analyzer Scale displays the energy level measured by the Analyzer.

Range: 0–60

Please note: Complex waveforms will usually clip before the total energy on the analyzer reaches 0 because it displays peak clipping rather than steady level reading. On sustained material or sine waves at 0 dBFS, the Analyzer will reach 0 when the actual signal reaches 0.

EQ Scale displays the EQ curve being applied to the signal. You can click and drag the scale with the mouse to increase the resolution of the curve graph; use this option when applying small amounts of EQ to your signal.

Range: +/-30 dB linear

Range Extended: +/- 30 dB (+/- 3 dB for first 2/3 of the scale)

Band Markers allow you to manipulate the EQ bands. Each marker corresponds to a certain band and is color coded.

The following keyboard shortcuts may be used to control Band Markers:

- **Option/Alt** – Hold Option (Alt) and click the marker to control Q; locks Frequency and Gain in place.
- **Control/Ctrl** – Hold, click, and drag the marker vertically to control Gain. Frequency and Q are locked in place.
Hold, click and drag the marker horizontally to control Frequency. Gain and Q are locked in place.
- **Command/Win**– Hold Command and Click the marker to toggle filter type.
- **Right Click** – Right-click on a band marker to solo the band you are adjusting.

To reduce DSP load, the Analyzer is not included in the H-EQ Lite component.

Output Section

Output fader controls signal output level.

- o In the H-EQ Stereo component, separate left and right channel faders are available.
- o In MS and Unlinked modes, the faders move separately to accommodate for left/M and right/S channel level differences. Faders may be re-linked momentarily using the fader link control to enable output level adjustment for both channels simultaneously.

Phase flips the phase of the signal by 180 degrees.

- o In the H-EQ Stereo component, there are separate left and right controls to adjust the phase on each channel independently.

Trim displays the maximum peak level of the output signal and its distance from 0 dBFS. Clicking on the trim value button resets it to 0, and applies the differential to the input level.

Full-scale **Output Meters** with clip indicators are located above the Output faders.

Smoothing



Older versions of H-EQ may introduce a noise when a control is moved, including when controlled under automation. The Smooth feature resolves this issue.

Normally, Smooth should be On, whether working in a new session or opening an existing session that contains instances of the new H-EQ version. However, when a session was created with the older version of H-EQ, Smooth will automatically set to Off. This assures that there is no change in sound.

The Smooth control is located in the WaveSystem Toolbar at the top of the plugin interface.