WAVES

H-EQ

HYBRID EQUALIZER

USER GUIDE

WAVES

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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 the time to read through this manual.

In conjunction, we also suggest that you become familiar with www.wavesupport.net. There you will find an extensive **Answer Base**, the latest **Tech Specs**, detailed **Installation** guides, new **Software Updates**, and current information on **Authorization** and **Registration**.

By signing up at www.wavesupport.net, you will receive personalized information on your registered products, reminders when updates are available, and information on your authorization status.

1.2 Product Overview

Waves H-EQ is a powerful Hybrid Equalizer which 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 Mid and Side content
- A flexible real-time frequency spectrum analyzer with multiple display options

1.3 Concepts and Terminology

The 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.

The Analog section provides control over the level of harmonics, hum, and noise levels added to the signal.

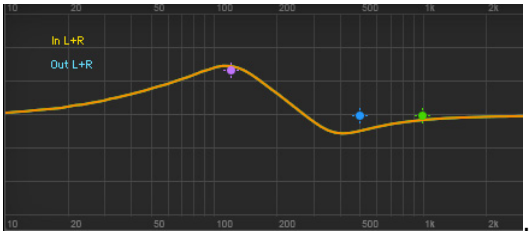
Analyzer

The H-EQ's frequency 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.

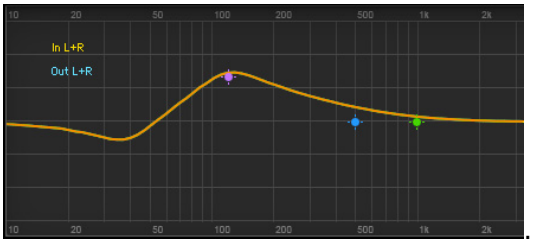
Asymmetrical Filter

The 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 like bass, kick drum, and piano, while high Q settings work well on high frequency content such as cymbals, strings, acoustic guitar, vocals and the like.

For example, when the Q is set all the way counter-clockwise (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 mids. 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 which lets you choose frequencies by clicking on notes. Until now, all EQs have been frequency-based, making them easier to use for engineers who are used to manipulating frequencies, but less for musicians who are accustomed to dealing with notes. For example, many people know that A4 = 440 Hz; putting this information to 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:

- 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.
- 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, and 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 plug-ins, 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

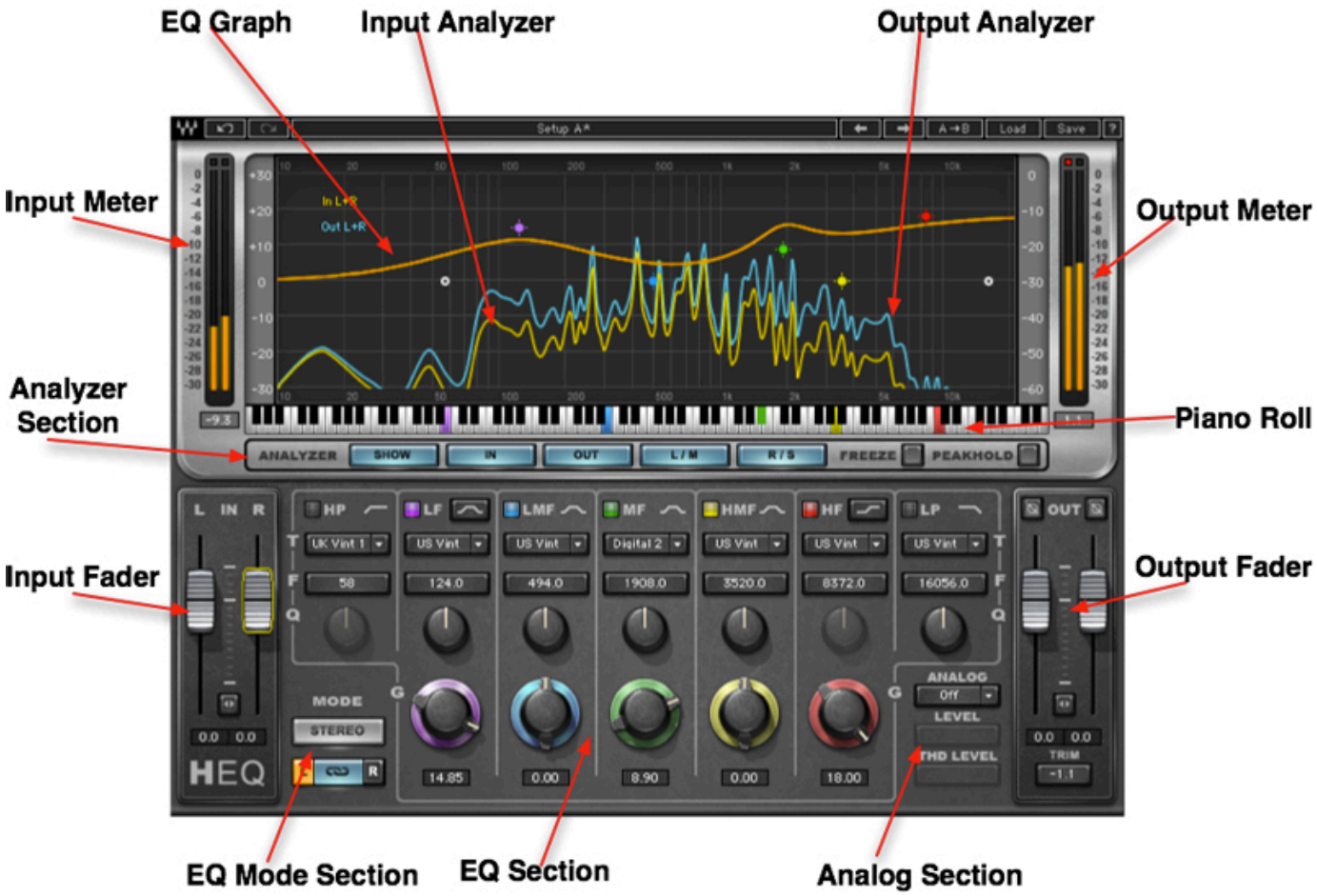
Chapter 2 – Quick Start Guide

- Insert H-EQ on track.
- Select the Mode: Linked, Unlinked, or MS
- Select a Filter Type for each band. Toggle between the types and get to know them, each has its own unique-sounding curve.
- Adjust the Frequency, Q, and Gain parameters as with any EQ.
- Turn on Analog and toggle between types to find the one that adds the color you find most pleasing.
- Play back the song and watch the Analyzer to better understand your frequency spectrum spread.
- Adjust the EQ accordingly.

Chapter 3 – Interface and Controls

3.1 Interface

3.2 Controls



Input Fader controls the signal input level.

Range: +12/ -30

- In the H-EQ stereo component, separate left and right channel faders are available.
- 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.

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.

- Input and output faders are unlinked to enable level control for each channel.
- 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

- 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.
- 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.
- The buttons to the left and right of the Listen control determine which channel is affected by the EQ section.

EQ Section

All bands have a color-coded On/Off switch.

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)*

LF – Low frequency

Type Range: 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 Hz – 21096 Hz

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

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

LMF – Low mid frequency

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

Shape Range: Bell only

Frequency Range: 22 Hz – 21096 Hz

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

MF – Mid frequency

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

Shape Range: Bell only

Frequency Range: 22 Hz – 21096 Hz

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

HMF – High mid frequency

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

Shape Range: Bell only

Frequency Range: 22 Hz – 21096 Hz

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

HF – High frequency

Type Range: 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 Hz – 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

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

Frequency Range: 21096 Hz – 16 Hz

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

Analog Section

Analog Type toggles between analog characteristic types.

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

Analog 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%

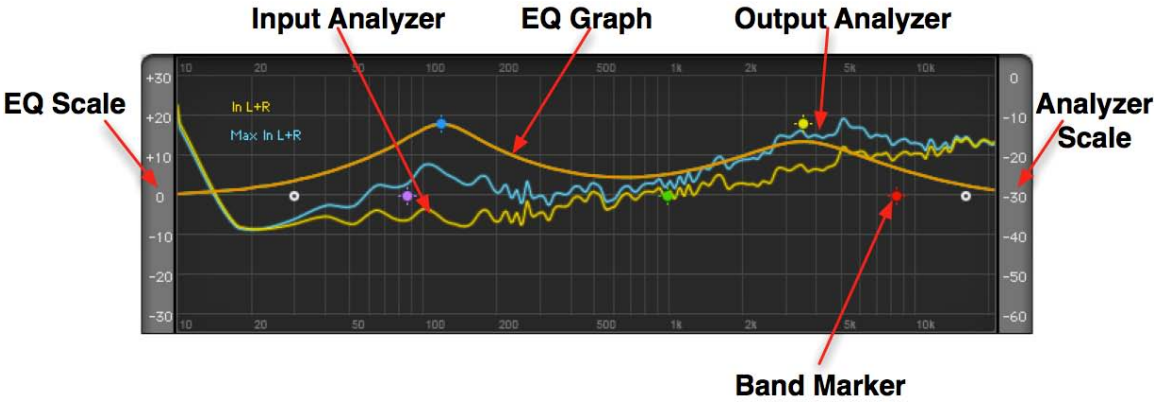
THD Level controls the level of harmonic distortion added to the signal.

Range: 0% – 1000%
Default: 100%

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



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 in the Analyzer.*

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, lock Frequency and Q in place; Hold, click and drag the marker horizontally to control Frequency, lock Gain and Q in place.
- **Command/Win**– Hold Command and Click the marker to toggle filter type.

Output Section

Output fader controls signal output level.

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

Phase flips the phase of the signal by 180 degrees.

- 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.

Chapter 4 – The WaveSystem

4.1 The WaveSystem Toolbar

All Waves plugins feature the WaveSystem toolbar which takes care of most administrative functions you will encounter while working with your Waves software. The features of the WaveSystem toolbar are the same on practically all Waves plugins, so familiarity with its features will be helpful whichever plugin you are using.

Toolbar Functions

	Opens the plugin About box
Undo	Undoes the last 32 actions
Redo	Redoes the last 32 undone actions
Setup A/B	Toggles between two presets, useful for comparison of parameter settings
L/R Arrows	Move to the previous or next preset
Copy A→B	Copies the current settings to the second preset register
Load	Recalls presets from file
Save	Saves presets in the Waves file formats
?	Opens the PDF manual for the plugin you are using

4.2 Preset Handling

Preset Types

Factory Presets are permanent presets in the Load menu. Factory presets cannot be overwritten or deleted. When applicable, different component plugins may have different factory presets.

User Presets are your favorite settings of the plugin saved as a preset in the Load menu, under ‘User Presets’. User Presets can be overwritten and deleted.

Setup Files may contain more than one preset. For example, a single file can contain all the presets for a session. When you open a Setup File, all its setups become part of your Load pop-up menu for fast access. This can be particularly useful with multiple instances of a plugin in a single session. By saving all the settings you create into a single Setup File, they can all be quickly available for every instance of that plugin.

Loading Presets and Setups

Click on the Load button to see the Load pop-up menu. The menu is divided into four sections. If a section is not currently available it will not appear in the Load pop-up menu.

Open Preset File…	Select to open any setup or preset file, whether from the Library or your own creations.
'Filename.xps':	Displays any currently loaded Setup File and its presets.
Factory Presets:	Displays the default Factory Presets.
User Presets:	Displays any loaded User Presets.

Saving Presets and Setups

Click on the Save button to see the Save pop-up menu. Four options are available. If an option is not currently available it will be grayed out and inaccessible.

Save to New File…	Select this to start a new Setup file. There are two prompts - first for the setup filename, then for the preset name. You must provide a name for both the setup file and the preset. Click OK (ENTER) to complete the save. It is a good idea to create a folder in which to save several setup files for a project.
Save 'File Name' – "Preset Name"	Overwrites the settings of the loaded preset (whether a User Preset or a preset from a Setup File) with the current settings. If a Setup File is

currently loaded, the name of the Setup File is displayed followed by the name of the preset itself. If a User Preset is loaded, its name is displayed.

Save to 'File Name' As… Saves the current settings as a new preset into the Setup file that is open (if one is not open, the option is grayed out). You will be prompted to give the preset a name.

Put into Preset Menu As… Save the current settings into a User Preset that will always be in your Load menu (until deleted). You will be prompted to give this preset a name. User Presets are stored in the plugin's preference file.

Deleting Presets

You may delete User Presets and presets within a Setup File. Factory Presets and Setup Library files cannot be deleted or overwritten.

1. Hold the Command (Mac)/Control (PC) key down.
2. Click-and-hold the Load button to see the pop-up menu.
3. While still holding the Command/Control key, select the preset or setup to delete.
4. A confirmation box will appear, allowing you to cancel or 'OK' the deletion.

A/B Comparison and Copying

The Setup A/Setup B button may be clicked to compare two settings. If you load a preset in the Setup B position, this will not affect the preset loaded into the Setup A position, and vice-versa.

If you want to slightly modify the settings in Setup A, you can copy them to Setup B by clicking on the Copy to B button, then alter Setup A and compare with the original Setup B.

The name of the current setup will be shown in the title bar (on platforms which support it), and will switch as you change from Setup A to Setup B.

Note: an asterisk will be added to the preset name when a change is made to the preset.

4.3 Interface Controls

Controls can be in one of three states:

1. **Not Selected** where the control is not the target of any user entry
2. **Selected** where the control is the target of mouse control entry only
3. **Selected and Active** where the control is the target for both mouse and keyboard entry

Toggle Buttons

Toggle buttons display the state of a control, and allow switching between two or more states. **Single-click** to change the control's state. Some toggle buttons have a text display which updates with the current setting, and others (bypass, solo, or monitoring toggles) illuminate when the control is active.

Some plugins have **link buttons** between a pair of toggle buttons, allowing click-and-drag adjustment while retaining the offset between the controls.

Value Window Buttons

Value windows display the value of a control and allow **click-and-drag** adjustment, or **direct control via the keyboard**.

- **Using the mouse**, click-and-drag on the value window to adjust. Some value windows support left/right, some up/down (as you hover over a button, arrows will appear to let you know which direction of movement that button supports). You may also use your mouse-wheel to adjust parameter values.
- **Using the arrow keys**, click once with mouse to select the button, and then use up/down – left/right (depending on the direction supported by that button) to move in the smallest incremental steps across the button's range (holding down

the arrow keys will move faster through the range).

- **Using key entry**, double click on the button to open the value window, and directly enter the value from your keyboard. If you enter an out of range number, the button stays selected but remains at the current setting. (System beeps if system sounds are on.)

Some plugins have **link buttons** between a pair of value windows, allowing click-and-drag adjustment while retaining the offset between the controls.

Sliders

Click or scroll the mouse-wheel on the slider itself or anywhere within the sliders track. The numerical value of the slider settings is displayed in a hover window above the slider path.

Hover Box

Hovering boxes will appear and display the control value when hovering with the mouse over the control.

Multiple Control Selection

One of the most powerful features of the WaveSystem is the ability to select and adjust multiple controls simultaneously. Using the mouse, drag-select the desired group of buttons or graphic controls by clicking and holding at a point outside the controls, and forming a rectangle that includes the controls you wish to adjust. Alternatively, press and hold Shift while clicking the mouse on any control you wish to link. This method is useful when you want to select two or more controls that are not adjacent to one another.

TAB Functions

TAB moves the ‘selected’ status to the next control, with shift-TAB moving in the reverse direction.

Additionally, the Mac has an option-TAB function for ‘down’ movement and shift-option-TAB for ‘up’ movement where applicable.

If you have several Value Window Buttons selected, TAB functions will take you through the selected controls only.

Hitting Esc or Return will return the 'focus' to the DAW application.

4.4 Waves Preferences (Pro Tools only)

When launching Pro Tools, hold Shift to view the Waves plugin Preferences window. The following options are available:

- Don't use AudioSuite plugins
- Don’t use RTAS plugins
- Rescan all plugins
- HUI control surface support (low resolution)
- Enable single-click text entry