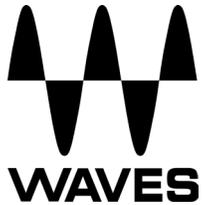


# WAVES GEQ

## GRAPHIC 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 plugins, please take the time to read through this manual.

In conjunction, we also suggest that you become familiar with [www.wavesupport.net](http://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](http://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 GEQ is a full-featured graphic equalizer with both Classic and Modern mono and stereo components, featuring 30 ISO bands plus high and low pass filters, a high precision floating parametric EQ bell filter, and a real-time analyzer.

GEQ Classic components use traditional proportional Q filters inspired by the renowned DN series 1/3 octave equalizers, which narrow the filter width as you increase a band's gain; GEQ Modern components utilize special Flat-Top filters which eliminate the artifacts associated with band interaction, and provide perfect plateau and stair-stepped responses. Set band gains one-by-one, or draw your curve via touch-screen or mouse. Finally, GEQ's integrated real-time analyzer lets you compare the difference between two sources. Created for live sound but equally useful in the studio as well, GEQ is powerful proof that all equalizers are not created equal.

## 1.3 Concepts and Terminology

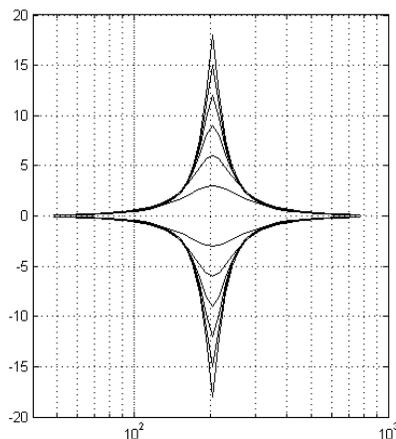
### Graphic EQ

Most graphic equalizers consist of a bank of filters with pre-determined (fixed) cutoff frequencies, typically divided into bands of 1/3 or one octave each, with frequency cutoffs defined by ISO standards (International Organization for Standardization). It's common to see the gain controls set as a horizontal array of faders with the lowest frequency on the left and the highest on the right. So if one were to draw a line that plots the gain fader positions at any given time, the resultant line would be a graphical representation of the equalizer's current frequency response, hence the name "graphic equalizer."

The GEQ offers three bands per octave for a total of 30 bands, similar to the hardware devices commonly used in live sound reinforcement systems. GEQ includes a faders array as well as parametric graph, plus a real-time analyzer with flexible routing.

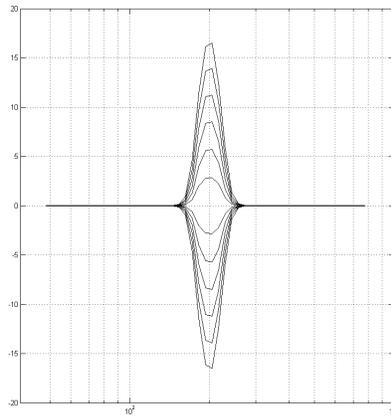
### Proportional Q

For its 30 main bands, the GEQ Classic component uses "Proportional Q" filters. The Q value is proportional to the gain adjustment; increasing a band's gain narrows the filter width.



## Flat-Top Filters

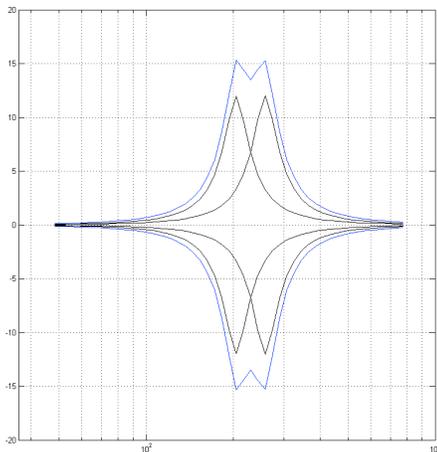
The GEQ Modern component utilizes special Flat-Top filters which eliminate the artifacts associated with band interaction, and provide perfect plateau and stair-stepped responses. Thus, boosting a set of consecutive bands by 6 dB will result in a 6 dB boost plane, without additional boost due to band interaction.



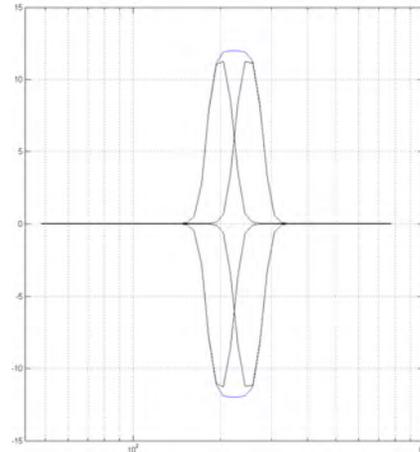
## Band Interaction

Close to 0 dB, Proportional Q bells have a fairly wide frequency range. This is not an issue when boosting or cutting frequencies in different ranges; however, when boosting adjacent bands, the two filters will overlap and interact, resulting in unintended gain levels.

**Classic Proportional Q Filters**



**Modern Flat-Top Filters**



## 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.

GEQ has a total of four components:

- GEQ Classic Mono
- GEQ Classic Stereo
- GEQ Modern Mono
- GEQ Modern Stereo

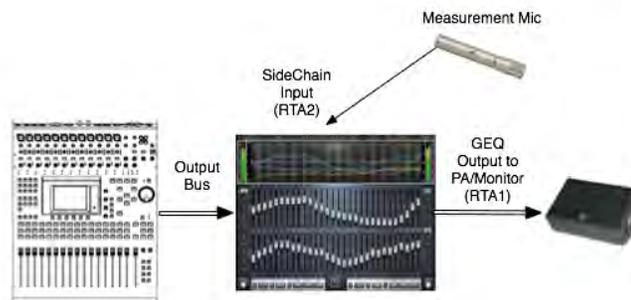
## Chapter 2 – Quick Start Guide

### Using the EQ

1. Open a mono or stereo GEQ component on a track.
2. Select **Drag** or **Draw** mode.
3. Drag mode: Select individual band faders, move each up or down to set its boost/cut.  
Draw mode: Select a band fader, move up or down and continuously left or right to draw the EQ curve.
4. For further adjustments, use the floating Parametric EQ section to set non-ISO frequency cutoffs.

### Setting and Calibrating the Analyzer

1. Open a mono or stereo GEQ component on an output track.
2. On the WaveSystem toolbar, go to **RTA1** and select a source. ([See Section 3.2.](#))
3. On the WaveSystem toolbar, go to **RTA2** and select a sidechain input. For example, the sidechain input can receive its signal from a microphone which measures the RTA1 source after passing through the PA system:



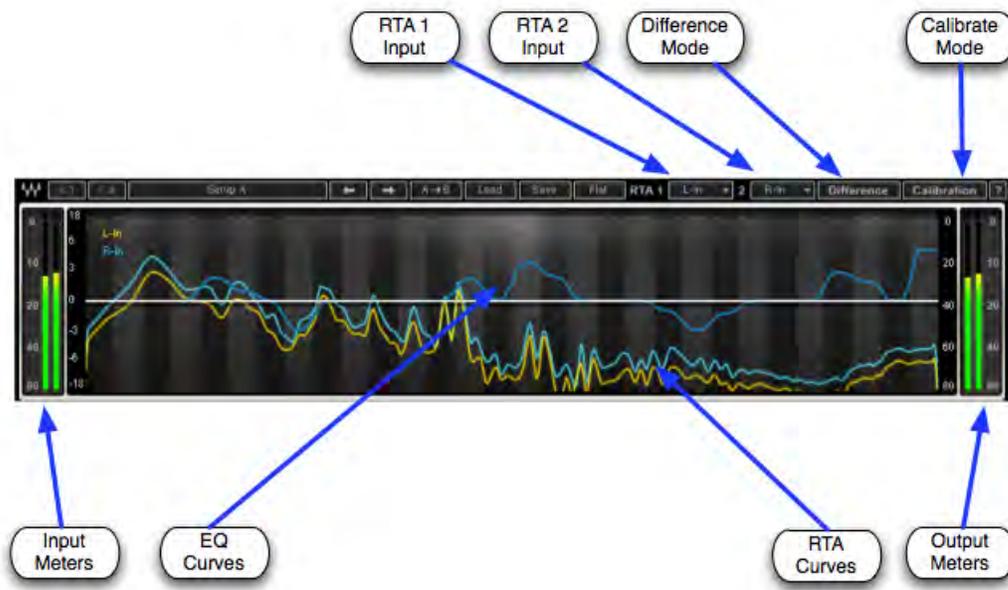
4. On the WaveSystem toolbar, activate Calibration Mode by clicking **Calibration**.
5. Select the RTA Mode: Fast or Slow.
6. If required, calculate the delay between the two RTA input sources, and enter the value in milliseconds into the **RTA1 Delay** field.

7. Adjust the RTA1 and RTA2 displayed curve levels using the faders next to the input and output meters. *Please note: Adjusting these faders will affect only the analyzer; it will not affect your output.*
8. Press **Diff** to view the difference in frequency response between RTA1 and RTA2.
9. Match the two signals manually using the EQ section of the plugin.



## 3.2 Controls

### Analyzer Section



**GRAPHIC DISPLAY / ANALYZER** shows the EQ curve, RTA1 and RTA2 input RMS frequency responses and the Difference between them.

**Brown** EQ curve on mono components; Left channel EQ curve on stereo components.

**Blue** Right channel EQ curve

**Yellow** RTA1 input frequency response

**Cyan** RTA2 input frequency response

**Red** Difference between RTA1 and RTA2

Frequency Range: 20 – 20,000 Hz

Level Range: -80 – 0 dBFS

**INPUT METER** displays input level (peak) in dBFS.

Range: -80 – 0 dBFS

**OUTPUT METER** displays output level (peak) in dBFS.

Range: -80 – 0 dBFS

**RTA1** assigns the first input to the real-time analyzer.

**RTA2** assigns the second input to the real-time analyzer.

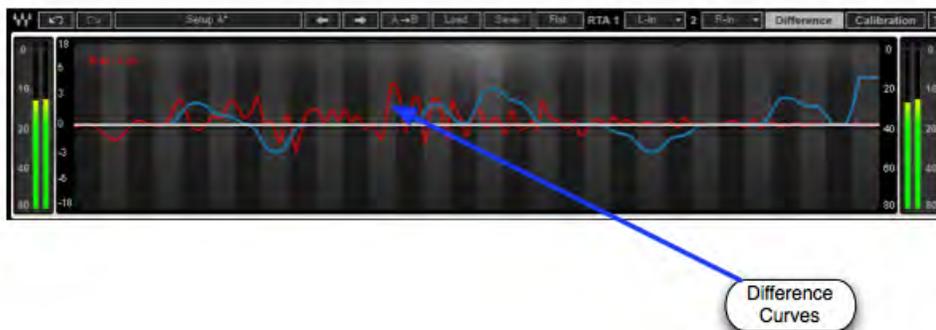
Mono Component Range: Off, In, SC-In, Out

Stereo Component Range: Off, L-In, R-In, LSC-In, RSC-In, L-Out, R-Out, L+R

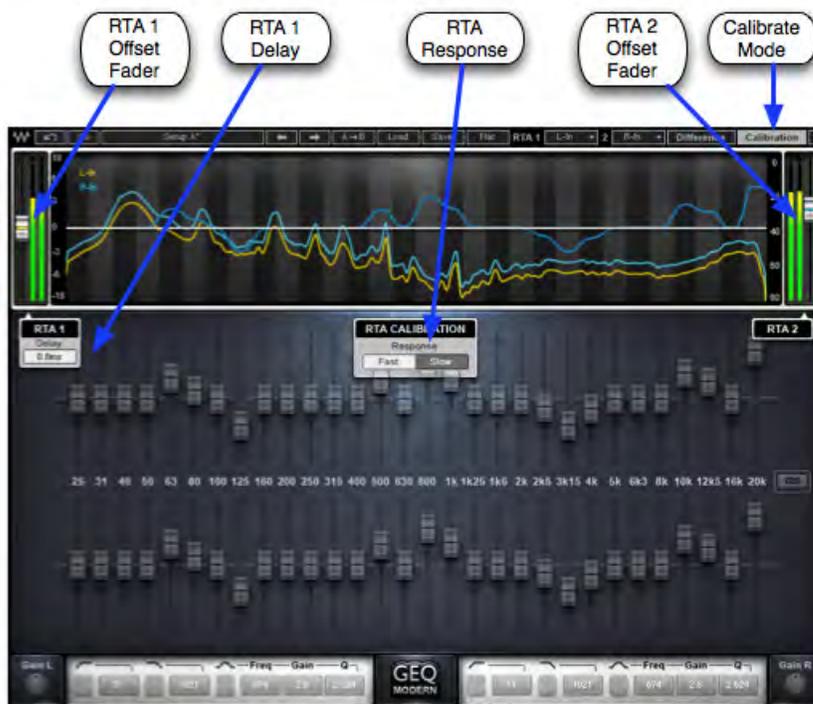
**DIFFERENCE** mode turns off the real-time analyzer and displays the difference in frequency response between RTA1 and RTA2. This is helpful when you need to:

- Adjust the output signal in relation to the measured post-system response.
- Match the left and right frequency responses.

Range: On, Off



## Calibration Mode



**CALIBRATION** activates the Calibration mode which calibrates the analyzer.

**RTA1 & RTA2 FADERS** are used to adjust and match the analyzer input levels.

**RTA CALIBRATION** set the response time of the analyzer.

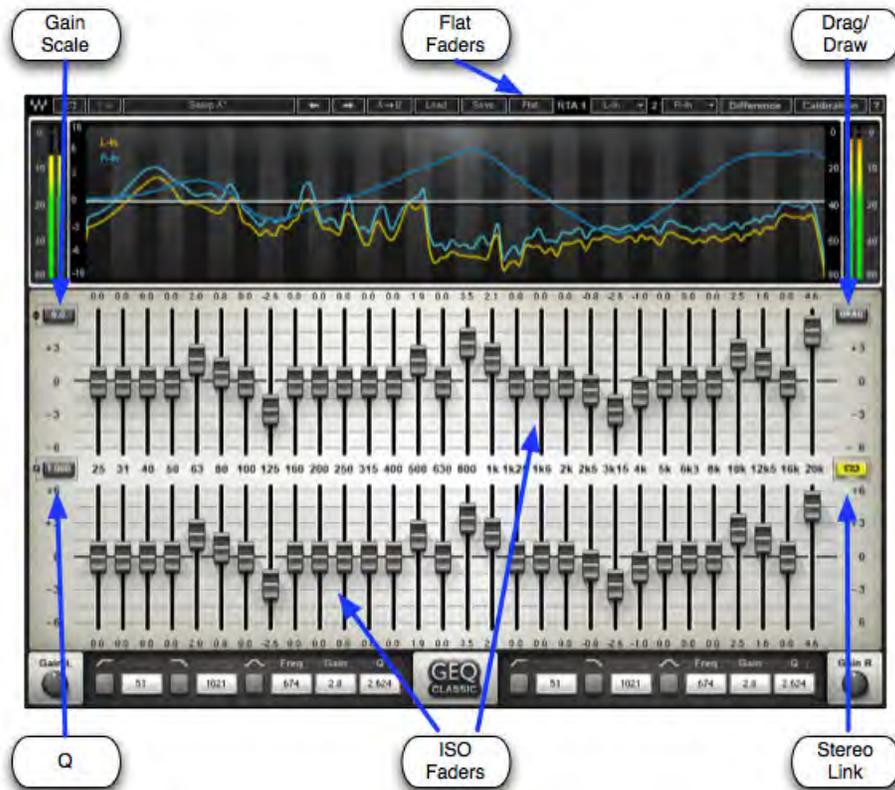
*Please note: When Difference is on, the response is Slow, regardless of the RTA Calibration setting.*

Range: Fast, Slow

**RTA1 DELAY** sets the alignment of RTA1 to RTA2.

Range: 0 – 341 milliseconds

## Graphic EQ Section



**SCALE** controls the maximum range of GEQ faders. The scale indicators next to the band faders update according to the selected scale. *For example, if the 6 dB scale is selected and 25 Hz is set to +5 dB, changing the scale to 12 dB increases the boost at 25 Hz to +10 dB.*

Range: 6, 12, 18 dB

**Q** functions as a multiplier for the proportional Q algorithm. *(Classic components only)*

Range 0.250 – 4.000

**ISO FADERS** control the gain of selected frequency centers.

Gain Range: -18 to +18 (dependent on Scale settings)

Frequency Cutoffs: 25 Hz, 31 Hz, 40 Hz, 50 Hz, 63 Hz, 80 Hz, 100 Hz, 125 Hz, 160 Hz, 200 Hz, 250 Hz, 315 Hz, 400 Hz, 500 Hz, 630 Hz, 800 Hz, 1 kHz, 1.25 kHz, 1.6 kHz, 2 kHz, 2.5 kHz, 3.15 kHz, 4 kHz, 5 kHz, 6.3 kHz, 8 kHz, 10 kHz, 12.5 kHz, 16 kHz, 20 kHz

**DRAG** selects the method of setting the band faders.

- Drag mode: Select individual band faders; move each up or down to set its boost/cut.
- Draw mode: Select a band fader; move up or down, left or right, continuously, to draw the EQ curve.

Range: Drag, Draw

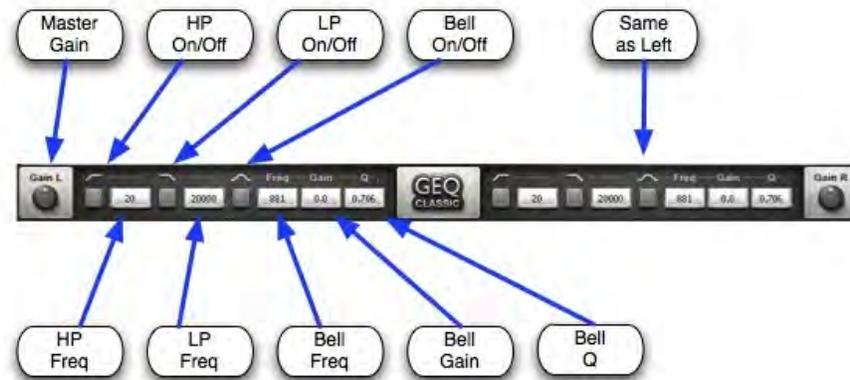
**LINK** relatively links left and right channels, including all bands, high and low pass filters, floating Parametric Bell EQ and Master Gain settings. *(Stereo components only)*

Range: On, Off

**FLAT** snaps all bands to 0 dB.

*Please note: This does not affect the floating Parametric EQ section.*

## Floating Parametric EQ Section



**HP** activates the high pass filter.

Range: On, Off

**HP FREQUENCY** sets the cutoff frequency of the high pass filter.

Range: 20 – 990 Hz

**LP** activates the low pass filter.

Range: On, Off

**LP FREQUENCY** sets the cutoff frequency of the low pass filter.

Range: 1000 – 20,000 Hz

**PARAMETRIC BELL** activates the floating parametric bell filter.

Range: On, Off

**PARAMETRIC BELL FREQUENCY** sets the cutoff frequency of the floating parametric bell filter.

Range 20 – 20,000 Hz

**PARAMETRIC BELL GAIN** controls the gain of the floating parametric bell filter.

Range: +/- 18 dB

**PARAMETRIC BELL Q** determines the width of the floating parametric bell filter.

Range: 0.250-50

**MASTER GAIN** controls the output level of the entire plugin.

Range: +/- 18 dB

## 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
<b>Undo</b>	Undoes the last 32 actions
<b>Redo</b>	Redoes the last 32 undone actions
<b>Setup A/B</b>	Toggles between two presets, useful for comparison of parameter settings
<b>L/R Arrows</b>	Move to the previous or next preset
<b>Copy A→B</b>	Copies the current settings to the second preset register
<b>Load</b>	Recalls presets from file
<b>Save</b>	Saves presets in the Waves file formats
<b>?</b>	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

**Save to 'File Name' As...**

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. 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:**

- **Not Selected** where the control is not the target of any user entry
- **Selected** where the control is the target of mouse control entry only
- **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**.

1. **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.
2. **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).
3. **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