Quartet DynPEQ™

for

soundBlade™

Operation Manual

Version 1.2

by

Wholegrain Digital Systems LLC

All features and specifications described within are subject to change. Wholegrain Digital Systems LLC makes no warranty of any kind regarding the accuracy, correctness, or sufficiency of the information in this document. However, we will make every reasonable effort to keep the document accurate, correct, and sufficient in response to your feedback.

Sonic Studio, LLC Software End User License Agreement

Please read this carefully. This Agreement is a contract between you, either an individual or single entity, and Sonic Studio, LLC. Your installation and use of the accompanying software indicates your agreement to be bound by the terms and conditions of this Agreement.

The software products, associated media, printed materials and electronic documentation accompanying this license (collectively, "Software") is owned by Sonic Studio, LLC. This Software is not sold, but may be used only by persons or entities that have been granted a License to use the program ("Licensee"). Such grant of License is conditional upon payment of applicable license fees and agreement to the License terms stated herein.

In consideration for your payment of the applicable license fees, Sonic Studio, LLC grants you the following rights:

1. Evaluation Software. Copies of this Software designated "DEMO," "BETA," or "TRIAL" in the file name or on the opening information screen may, in some cases, be provided by the Licensor for no payment or a payment which is a percent of the normal licensing fee. Such Software is intended to give you the opportunity to evaluate the Software and may incorporate time, data size or other limits. Evaluation Software may be transferred, unmodified, provided it is accompanied by this license, all of the original Software's proprietary notices, and any other documentation that originally accompanied the Evaluation Software. SONIC STUDIO, LLC DISCLAIMS ALL WARRANTIES, EXPRESS OR IMPLIED, OF THE EVALUATION SOFTWARE, INCLUDING WITHOUT LIMITATION WARRANTIES OF MERCHANTABILITY AND OF FITNESS FOR A PARTICULAR PURPOSE. THE EVALUATION SOFTWARE IS PROVIDED "AS IS."

2. Personal License. If this Software is registered in the name of an individual person, the following provisions shall apply to that individual and their **Personal License**:

(a) One license of the Software may be installed on a single computer or hardware–based authorization device;
(b) The Software may be installed on a network, provided that a licensed copy of the Software has been acquired for each person permitted to access the Software through the network;
(c) A single copy of the Software may be made for archival or backup purposes, provided the copy contains all of the original Software's proprietary notices;
(d) If you have purchased licenses for multiple copies of the Software, you may make the total number of copies of the Software stated on the packing slip(s), invoice(s), electronic confirmation(s), or Certificate(s) of Authenticity. Any copy must contain all of the original Software's proprietary notices. The number of copies on the packing slip(s), invoice(s), electronic confirmation(s), or Certificate(s) of Authenticity is the total number of copies that may be made on each platform.

3. Commercial or Institutional License. Versions of this software intended for use under the **Personal License** section must be registered in the name of an individual person for the sole use of that individual. Software used by more than one individual shall be considered Commercial or Institutional. The following provisions shall apply to Commercial or Institutional Licenses:

(a) One license of the Software may be installed on a single computer or hardware–based authorization device;
(b) The Software may be installed on a network, provided that a licensed copy of the Software has been acquired for each person permitted to access the Software through the network;
(c) A single copy of the Software may be made for archival or backup purposes, provided the copy contains all of the original Software's proprietary notices;
(d) If you have purchased a license for multiple copies of the Software, you may make the total number of copies of the Software stated on the packing slip(s), invoice(s), electronic confirmation(s), or Certificate(s) of Authenticity. Any copy must contain all of the original Software's proprietary notices. The number of copies on the packing slip(s), invoice(s), electronic confirmation(s), or Certificate(s) of Authenticity is the total number of copies that may be made on each platform.

4. Restrictions.
(a) This software contains trade secrets and as such, may not be modified, translated, reverse engineered, decompiled, or disassembled. You may not create derivative works based on the Software.
(b) You may not rent, lease, grant a security interest in, or otherwise transfer rights to the Software.
(c) The Software is licensed, not sold. Title to and copyright in the software, and in any copies you are permitted to make, are owned by Sonic Studio, LLC. You may not, without the express written consent of Sonic Studio, LLC, copy or reproduce any part of the Software except as specified above.
(d) The Software is specifically authorized for use on a single, individual computer and its associated hardware serial number or use with a hardware–based authorization device. One license transfer is permitted for each Software Serial Number held. Additional authorizations require additional purchases.

5. Terms. Except as provided for evaluation software, the License will continue until it is terminated. Sonic Studio, LLC may terminate the License if you fail to comply with the terms of this agreement. You may terminate the License at any time for any reason. Upon termination by either party, you must promptly return to Sonic Studio, LLC, or destroy the software and all copies and extracts.

6. Export Controls. This Software may not be shipped, transferred or re-exported into any country prohibited by the United States Export Administration Act.

7. Limitations of Liability. POTENTIAL DIFFERENCES IN THE SYSTEMS THE SOFTWARE IS RUN ON MAKE IT IMPOSSIBLE TO ADEQUATELY PREDICT WITH CERTAINTY THE PERFORMANCE OF THE PRODUCT. AS SUCH, SONIC STUDIO, LLC DOES NOT WARRANT THAT THIS PRODUCT WILL OPERATE ERROR FREE OR OPERATE WITHOUT INTERRUPTION. THIS SOFTWARE IS PROVIDED "AS–IS." TO THE MAXIMUM EXTENT PERMITTED BY APPLICABLE LAW, IN NO EVENT SHALL SONIC STUDIO, LLC OR ITS SUPPLIERS BE LIABLE FOR ANY SPECIAL, INCIDENTAL, INDIRECT, OR CONSEQUENTIAL DAMAGES WHATSOEVER (INCLUDING, WITHOUT LIMITATION, DAMAGES FOR LOSS OF BUSINESS PROFITS, BUSINESS INTERRUPTION, LOSS OF BUSINESS INFORMATION, OR ANY OTHER PECUNIARY LOSS) ARISING OUT OF THE USE OF OR INABILITY TO USE THE SOFTWARE PRODUCT, EVEN IF SONIC STUDIO, LLC HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. IN ANY CASE, SONIC STUDIO, LLC'S ENTIRE LIABILITY UNDER ANY PROVISION OF THIS EULA SHALL BE LIMITED TO THE GREATER OF THE AMOUNT ACTUALLY PAID BY YOU FOR THE SOFTWARE PORTION OF THE PRODUCT OR US$10.00.

8. Miscellaneous. This License represents the entire Agreement between the Licensee and Sonic Studio, LLC. If any provision of this License is held to be unenforceable, that provision will be amended only to the extent necessary to make it enforceable. The remaining provisions of this License will remain in full force. The terms of this Agreement shall be construed under the laws of the State of California.

Table of Contents

Introduction to DynPEQ 4
Roadmap for This Manual 4
Help Us Help You 4
Parameter Window Layout and Contents 5
Fine Adjustments 6
Coarse Adjustments 6
Band Bypass/Solo 6
Input Processor 6
Peak Monitors 6
Peak Limiter 6
Limiter Reduction 6
A/B Registers 6
All Bands Bypass 6
Effect Bypass 6
Display Adjustments 7
Scroll View and Window Controls 7
Operation of Parameter Window Controls 8
Slider-Text 8
Type Selector 8
Button 9
Coarse Bead 9
Band Note 10
Band Well 10
Section Expand 10
The Toolchest: Administrative Tools 11
Band Toolchest 11
New Drawer 11
Delete Item 11
Rename Item 11
Moving Items within the Band Toolchest 11
Moving a Band to the Parameter Window 11
Moving a Band to the Band Toolchest 12
Band Note Field and Parameter Load/Save 12
Moving All Bands to the Band Toolchest 13
Moving All Bands to the Parameter Window 14
Persistent Store of Band Toolchest 14
Patch Store 14
Patch Load and Patch Add/Replace 14
Patch Remove 14
Patch Title 14
Store Capacity 14
Patch and Page Up/Down 14
Background Parameter Window 15
RMS Calculation 15
Background Color 15
Signal Processing and Band Configuration Tutorial 16
Band Operation: Tuning 16
Band Operation: Dynamics 18
Dynamic Parametric Equalization 21
Interaction with the Host Workstation 24
Storage in the Band Toolchest 24
Storage in the Patch Store 24
Caveat on Restoring Dynamics Parameters 24
About Window 24
Parameters Button 25
Parameter Window Level 25
Operation Tips 25
Operational Issues 26
Reporting Problems 26
Appendix: Legend of Mouse and Keyboard Operations 27

Introduction to DynPEQ

This manual describes the operation of Quartet DynPEQ, both external and internal. DynPEQ refers to dynamic parametric equalization.

What, then, is dynamic parametric equalization?

Audio professionals and enthusiasts alike are familiar with dynamics processors (compressors, expanders, etc.) and parametric equalizers. Dynamic parametric equalization is an integrated combination of the two processors. That is to say, it is a dynamics processor, a parametric equalizer, and a dynamically controlled parametric equalizer rolled into one package.

Quartet DynPEQ offers four bands of dynamic parametric equalization bands. Each band has controls normally associated with a parametric equalizer and a dynamics processor. The parametric equalizer and dynamics processor portions of a band can be individually bypassed, which disables its respective functionality.

Shutting off the dynamics of a band turns it into a traditional parametric filter. Upon finding an appropriate parametric setting for a source, you may notice that the setting does not sound as appropriate for pianissimo or fortissimo portions of the source. In addition, you may find that details within the parametric band are too emphasized (punchy) or under-emphasized (washed out). This is where the dynamics portion of the band can be of assistance. The dynamics control of the band will operate only within the parametric band that you have tuned. Compression and/or expansion can help bring out the details or dynamic consistency that is sought after.

Similarly, shutting off the equalizer portion of a band turns it into a traditional dynamics processor. You may have experienced the ear fatigue that is associated with compression pumping. By reactivating the equalizer band, you may find that dynamics applied only to the spectral bands in need is easier on the ears.

To use an analogy, the signal processing capabilities of traditional parametric equalizers and dynamics processors project lines in different directions. DynPEQ retains the two lines and projects a plane of signal processing possibilities going through the lines. It creates an extra dimension of audio processing. Try your EQ and dynamics ear training drills with both EQ and dynamics active!

The internals of Quartet DynPEQ can be described as 'deliberate.' By this we mean the dynamics of this plugin are designed to avoid over-reaction, which can be audible whether applied to a single band or the entire spectrum. So while Quartet DynPEQ can be set up to de-ess and other functions of specialized dynamics processors, you will likely find that the specialty processors are very good at their specialty. By the same token, we don't think you will find that the specialty processors sound as good as Quartet DynPEQ. We at Wholegrain hope that you will find the plugin powerful yet transparent.

A toast to the pursuit of the golden tone. Cheers, from Wholegrain Digital Systems LLC

Roadmap for This Manual

The Parameter Window Layout section outlines regions in the layout of the parameter window and their functional categories.

The Operation of Parameter Window Controls section describes the general categories of controls on the parameter window and how they can be manipulated with the mouse and keyboard.

The Toolchest and Drag-and-Drop section explains the operation of the toolchest, a library where tuning settings for individual bands can be saved and retrieved along with project-specific settings for the entire plugin.

The Signal Processing and Band Configuration Tutorial section covers each specific band control and how it affects band tuning and signal processing.

The Interface to the Host Workstation section documents 1) the controls that the workstation software can retain and 2) an auxiliary window, the about window, that controls issues that affect CPU usage.

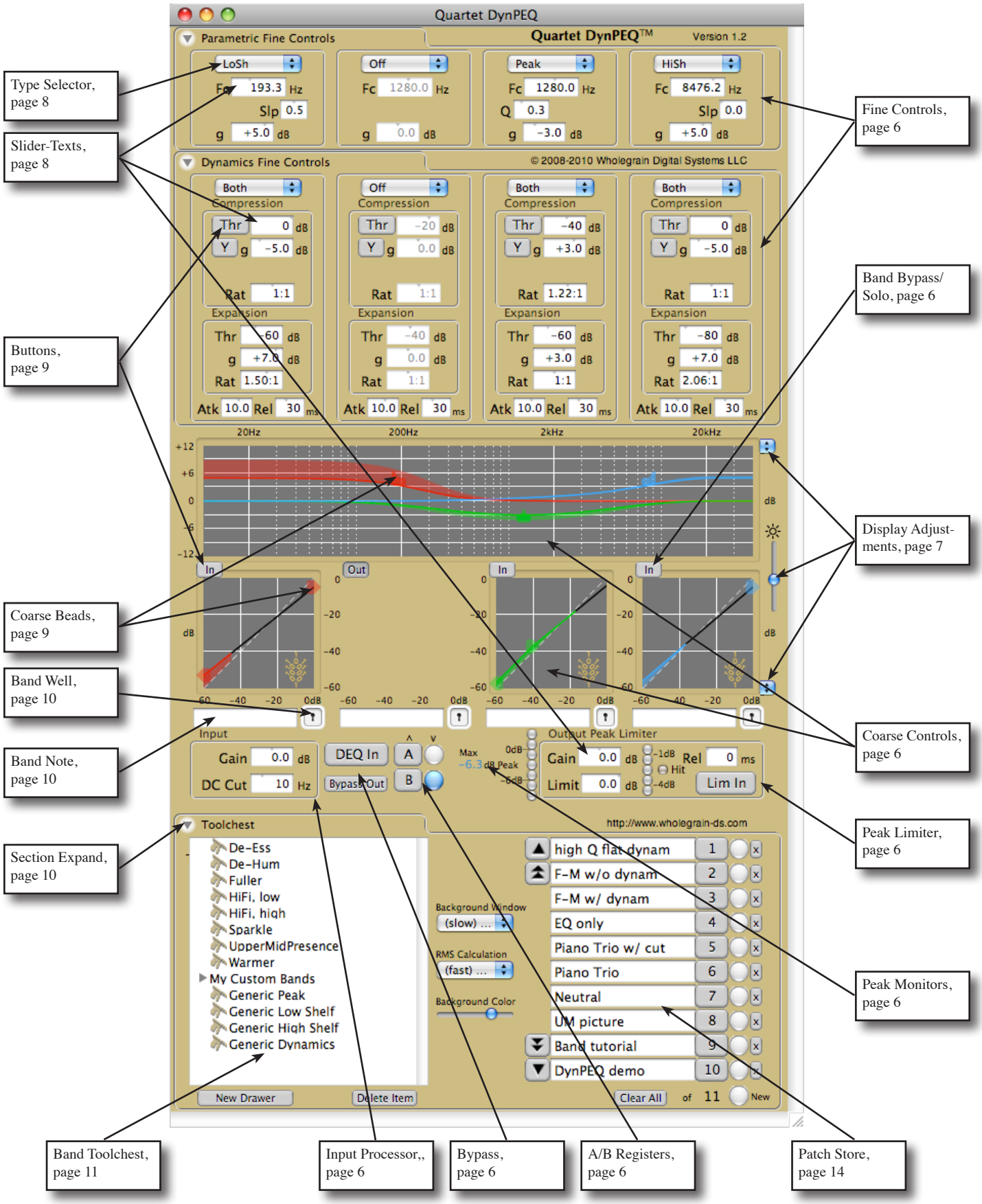
Lastly, the Operation Tips and Reporting Problems sections reveal hints and shortcuts for running Quartet DynPEQ, along with suggestions for making a good problem report.

Help Us Help You

If you find errors or factual issues with this manual, please do not hesitate to inform us. If you feel that something should be mentioned in this manual and yet is not, please point out what we missed. We also welcome your suggestions as to the manual's organization and presentation.

Parameter Window Layout and Contents

In a PDF viewer, click on boxes in the margin to jump to section.



Fine Adjustments

There are two rows of fine adjustment boxes. The top row controls the tuning parameters, and the bottom row controls the dynamics parameters. The parameters in this section are primarily text fields that can also act as continuous controllers. These fields are called slider-texts in this manual, and they will be described in the next section.

Coarse Adjustments

There are two rows of coarse adjustment boxes below the fine adjustments. The top row controls the tuning parameters, and the bottom row controls the dynamics parameters. This section allows for control of multiple band parameters and visual feedback on DynPEQ operation.

Band Bypass/Solo

The fine and coarse adjustments are arranged in four columns. Each column is called a band. Each band has a bypass button that can turn the band on and off in the plugin. The button label 'In' indicates the band is on, and 'Out' indicates the band is off. Note that if the band is off either by the band bypass button or the processor bypass button, the coarse adjustments for that band disappear.

Shift-clicking on the band bypass button will isolate (or 'solo') the band by bypassing the other bands and activating the band shift-clicked. The button will turn red with a 'Solo' label, and the all bands bypass button turns red with a 'Solo On' label. Further clicks on band bypass buttons with the shift key down in solo mode will toggle bands in and out of the solo mix. A regular click on any red solo button will terminate band solo.

Input Processor

The input processor consists of two slider-text parameters that are applied to the audio input prior to the dynamic parametric equalizer. 'Gain' is the gain applied to the input. 'DC Blk Cut' is the cutoff frequency of a 6dB/octave DC-block filter. To deactivate the DC-block filter, set the cutoff frequency to 0 Hz.

Peak Monitors

There are two peak monitors that operate on the interpolated peak levels after dynamic equalization but prior to output gain and limiting. The monitor to the left, in blue-colored text, is a running maximum peak value, which can be reset by clicking on the text. The text of the running maximum peak will briefly turn red when a limiter hit occurs, but this will not affect the running measurement unless a new maximum has been established. The monitor to the right is a coarse peak meter. The values it can display are –10 dB to +2 dB, in increments of 2 dB.

Peak Limiter

The peak limiter employs the interpolated peak levels taken from the dynamic equalizer output. 'Gain' is the gain applied to the equalizer output prior to limiting. 'Limit' is the maximum interpolated level the output signal can attain. The 'Hit' monitor indicates whether the limiter has become active, that is, if the post-gain level has exceeded the limit level. The hit monitor is persistent, and will stay in the on state until it is clicked with the left mouse button. As mentioned in the last paragraph, the running maximum peak text color is a non-persistent indicator of limiter hits. 'Rel' is the release time applied to the limiter when it activates. The 'Lim In' button activates and disables limiter processing, but does not affect the output gain.

Limiter Reduction

Within the peak limiter field, to the left of the hit monitor, is a meter that displays the limiter gain currently applied. The meter will not register if limiting is not active. The values it can display are -4dB to slightly less than 0dB, in increments of 1 dB. Note that increasing limiter attenuation moves the meter downwards, contrary to the motion of the coarse peak meter.

A/B Registers

The A and B registers store the band, input processor, and peak limiter parameters in a local area outside of the workstation host for quick comparisons. The round unlabeled buttons to the right, under the downward arrow, store the operational parameters to the corresponding register. The store button will turn blue whenever the operational parameter set matches that in the register, else it will be colorless. The square buttons to the left, under the upward arrow, transfer the parameters in the labeled register to the operational parameters.

All Bands Bypass

The all bands bypass button activates and disables all dynamic equalization for comparative evaluation. 'DEQ In' signifies that dynamic equalization is on. 'DEQ Out' signifies that it is off. When a band is in solo mode, this button enters a special mode with a 'Solo On' label. Clicking the button in this special mode will deactivate solo mode.

Effect Bypass

The effect bypass button is equivalent to the bypass function for the host workstation. This button is activated by a shift-click only, and can be deactivated by a regular click. The plugin will attempt to notify the host workstation that the bypass status has changed. Whether the workstation reacts to the notification can vary. Similarly, the state of the effect bypass button reflects the

workstation effect bypass state, so the button state can be changed by bypassing the effect on a workstation window.

Display Adjustments

The display adjustments to the right side of the screen affect the graphics in the coarse adjustments section. The selector adjacent to the coarse tuning adjustments sets the corresponding maximum y axis range. Similarly, the selector adjacent to the coarse dynamics adjustments set its minimum y axis range. The slider between the two rows adjust the background brightness of the coarse adjustments.

Scroll View and Window Controls

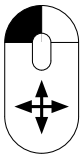
The parameter window may have its size adjusted using either the diagonal drag device in the lower right corner or the green button in the window bar. When the parameter window is less than full size, scrollbars will appear that can move the window contents within the reduced view. The yellow button in the window bar sends the parameter window to the data section of the system dock. The red button in the window bar dismisses the parameter window. In this case, only the about window, described below, can restore the parameter window into view.

Operation of Parameter Window Controls

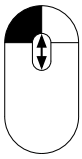
Slider-Text

The slider-text is the main parameter control for the fine adjustments, input processor, and output limiter. It appears to be a regular text entry field, and it can be used as such. However, when the field is clicked on, it can function as a continuous controller.

When the left mouse button is clicked and held down,

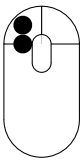


OR



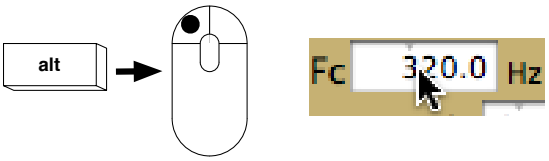
the field inverts colors and the mouse cursor will disappear. The value in the field will increase in value as the mouse is moved up, or as the scroll wheel is rolled up. The value will decrease as the mouse is dragged down, or as the scroll wheel is rolled down. The value in the field will not go beyond its minimum or maximum. The field will remain a continuous controller (the slider state) as long as the left mouse button is held down. However, if the mouse or scroll wheel does not move for five seconds while the left mouse button is down, the field will automatically exit the slider state. The speed at which the dragging or scrolling updates the parameter can be slowed by pressing the command (also known as apple) key while updating.

To manually enter text into the field, double-click it with the left mouse button.



The text in the field can then be edited as one normally would. Note that there is a blue halo around the field, also known as a focus ring. The field will be in edit mode as long as the focus ring is present. Edit mode ends when the tab or return key is pressed or another text field is left-clicked. It is important to note that the edited parameter value will not be entered into the plugin and workstation until edit mode concludes on that slider-text field, so it is best to make a habit of hitting tab or return after entering a new field value.

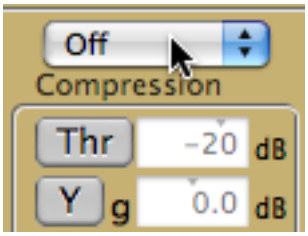
Alt-clicking the field will return the value to its default



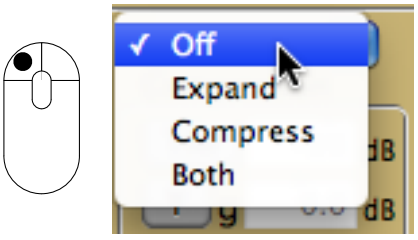
Lastly, note that there is a small gray notch along the top of the slider-text. This notch indicates where the current value of the parameter lies in its valid range. The notch being all the way to the left signifies the minimum value of the range, and the extreme right indicates the maximum. The notch itself is not an active control that can be clicked and manipulated.

Type Selector

The operation of the type selector is straight forward.

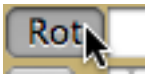


Left-clicking on the control presents a menu of choices, of which the desired choice is selected by left-clicking on it.

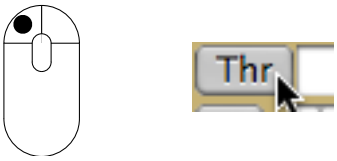


Button

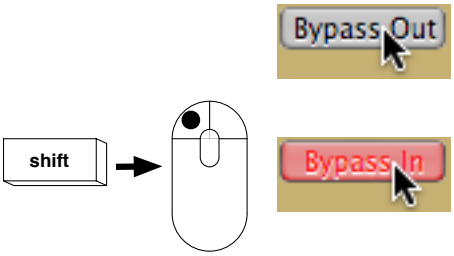
The operation of the button is also straight forward.



Left-clicking on the control changes its state. The button will have a different text label and graphic appearance.



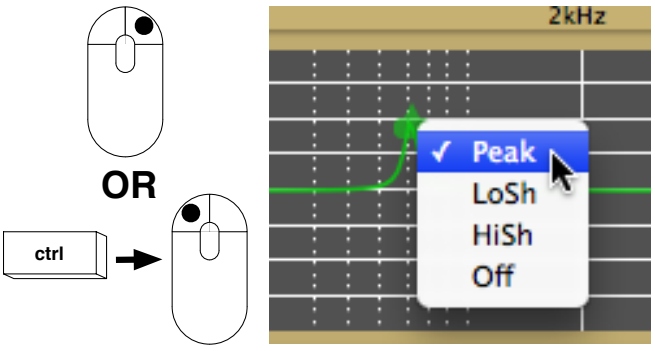
The band bypass/solo and effect bypass buttons have a special mode that can be enabled by shift-clicking on the button.



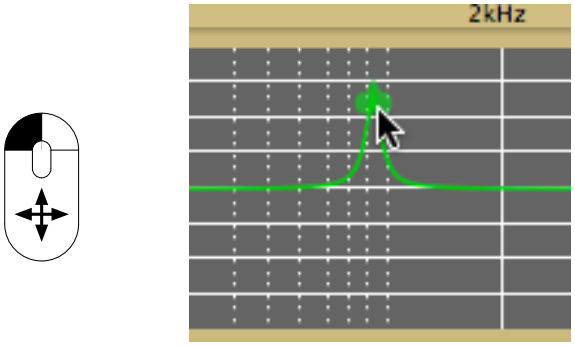
Coarse Bead

The coarse adjustments are controlled by what are called beads. They are location markers that can be moved in a two-dimensional field. There are two beads in the dynamics coarse adjustments but only one in the tuning coarse adjustments. The beads are capable of controlling most of the parameters in the fine adjustments.

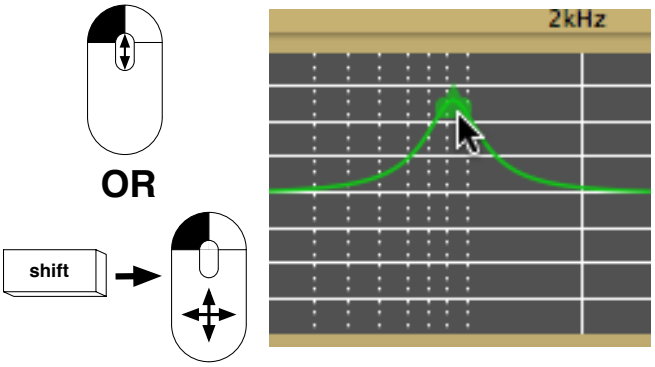
A click of the right mouse button or a control-click of the left mouse button displays the type selector menu for the category. Choose the new type in the same manner as the type selector control.



Click the bead and hold with the left mouse button to move the bead within the field.

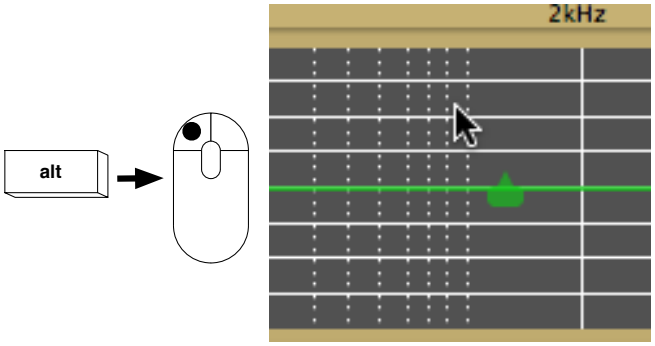


To adjust the auxiliary parameter, which does not pertain to the x-y position of the bead, either click and hold the left mouse button and move the scroll wheel or, with the shift key pressed, click and drag with the left mouse button down.



While adjusting the coarse bead, the speed of the mouse and scroll reaction can be slowed by holding down the command (also known as apple) key.

Lastly, alt-clicking the bead will restore the mouse and scroll parameters the bead controls to defaults.



Band Note

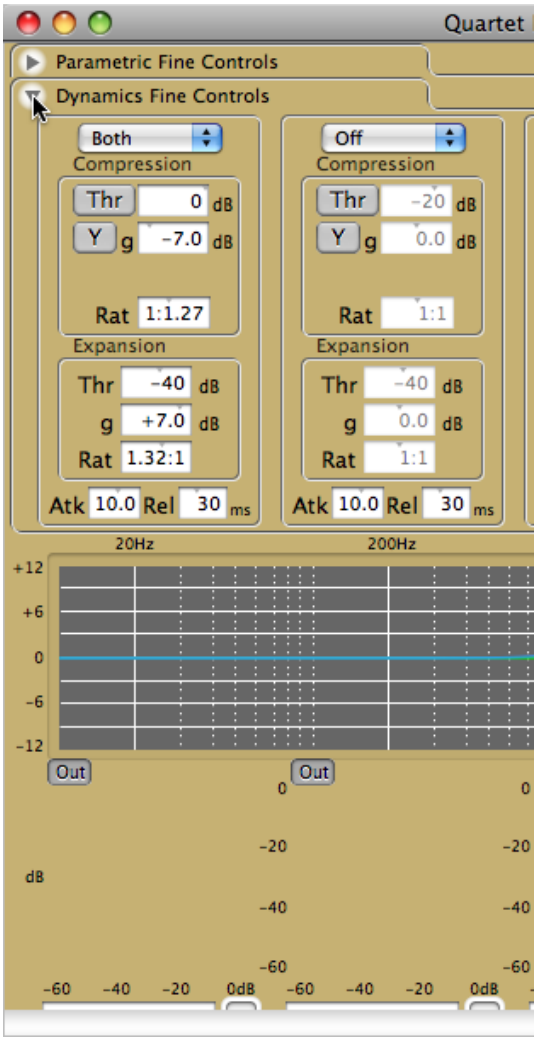
Just underneath the coarse controls is a row of administrative controls for each band. The control on the left side of the band column is a text field where brief user notes for the band can be typed in. This note is associated with the band when communicating with the toolchest. To avoid confusion, the band note is cleared when a patch register, A/B or patch store, is loaded.

Band Well

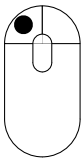
The control on the right side of the band column is a well that functions as either the source or destination of band transfers between the band toolchest via drag-and-drop. Within the well is an image of a keyhole.

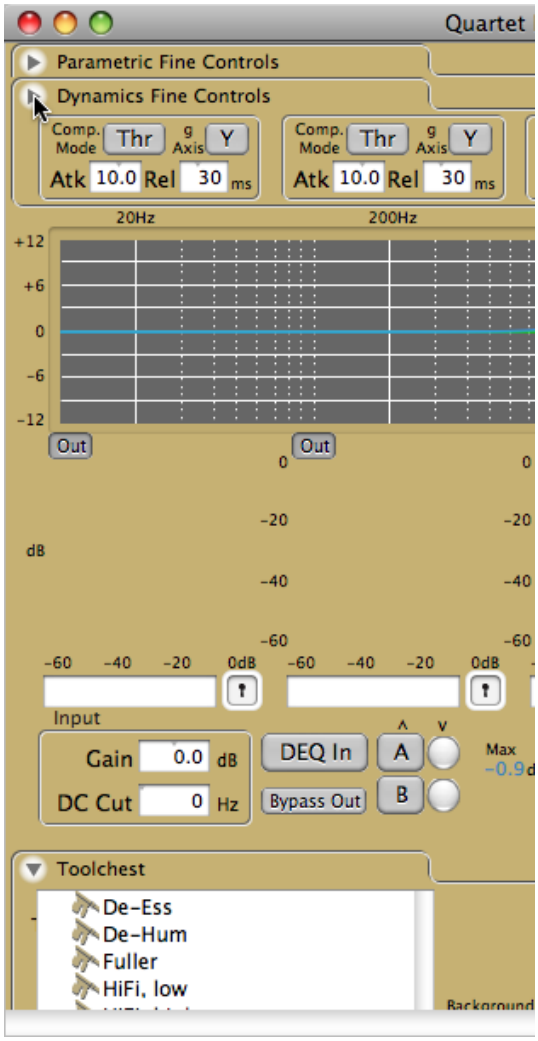
Section Expand

The parameter window contains many elements, and it is possible for the window as sized to be unable to display all elements of interest. To this end, some parts of the parameter window are cast in collapsable sections. The upper left corner of a collapsable section contains a triangle for controlling the section state. It functions in the same manner as a Button.



Click on it to toggle the section state.





The Toolchest: Administrative Tools

Band Toolchest

The left portion of the toolchest view is the band toolchest. The band toolchest is a persistent store of useful settings of individual bands. This store is unique to DynPEQ plugins and is not part of any host workstation project. The bands are represented in the toolchest view as the heads of a skeleton key with a band note attached. In addition, the settings of all bands may reside in the band toolchest, represented by three multi-colored key heads. Drawers are represented by solid triangles with names attached, and they can hold both bands and other drawers.

New Drawer

Left-clicking the new drawer button creates a new drawer and prompts for a drawer name. Note that the text edit focus ring will be around the name of the new drawer, awaiting for the title to be typed in.

Delete Item

A band or drawer in the band toolchest can be selected by left-clicking on the row where the item is displayed. If an item is selected, left-clicking the delete item button will prompt for confirmation to remove the item permanently from the band toolchest.

Rename Item

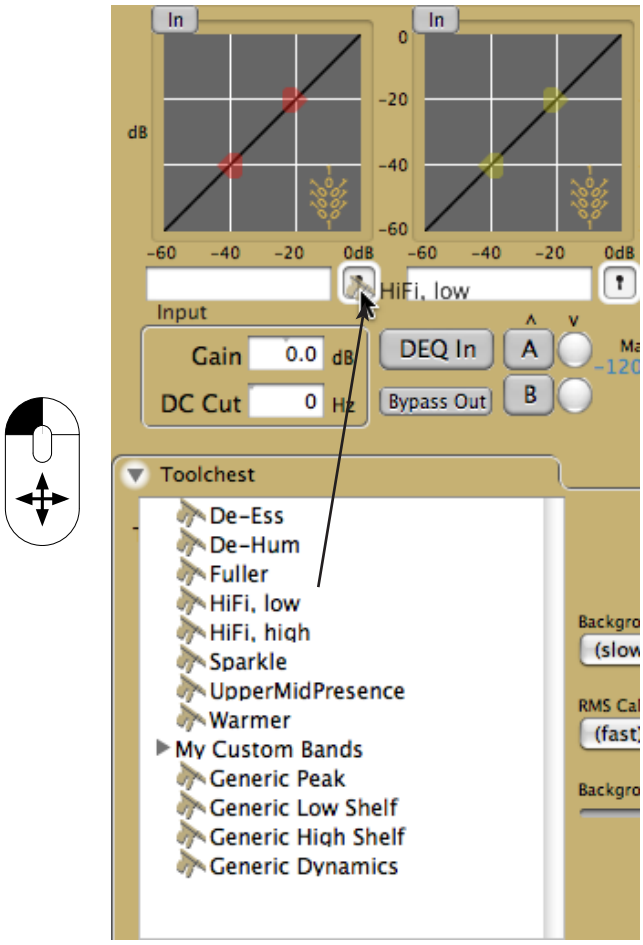
Double-clicking on the name of an item in the band toolchest will allow the name to be edited. If the new name matches the name of another item in the same drawer, the editor will not exit until the name is changed.

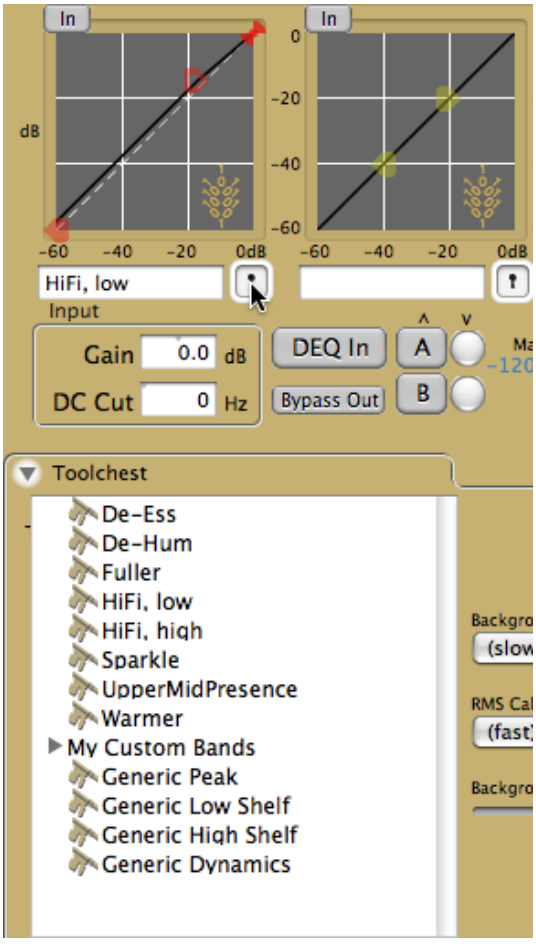
Moving Items within the Band Toolchest

Items in the band toolchest can be moved to another drawer by left-clicking on the item, while holding down the left mouse button dragging to the destination drawer, and releasing the left button over the destination. This operation is commonly called drag-and-drop. If the drop destination drawer has an item with the same name, a warning prompt will appear asking for confirmation to replace the existing item in the drawer. Agreeing to complete the replace operation will permanently remove the existing item from the toolchest.

Moving a Band to the Parameter Window

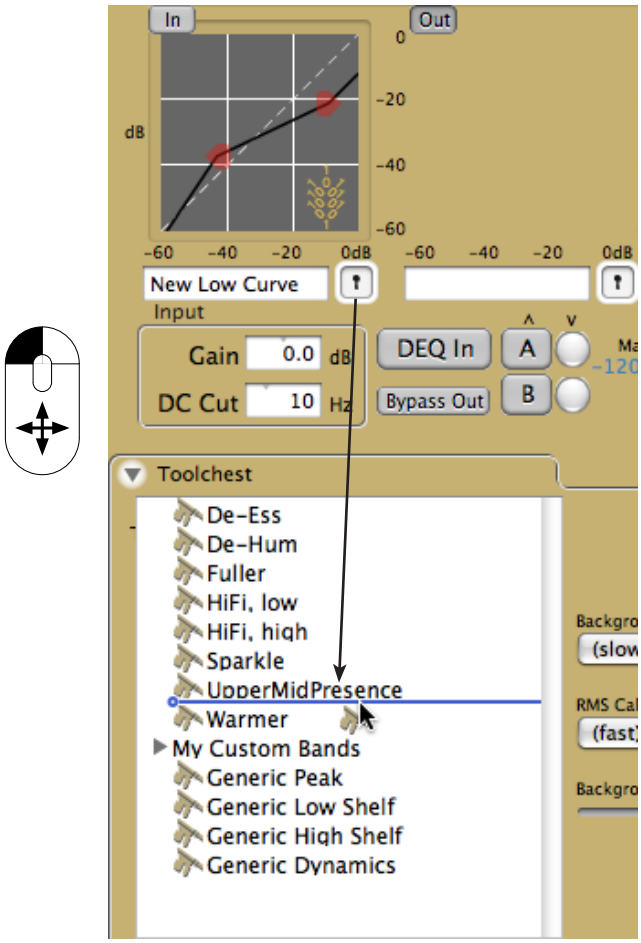
Bands in the toolchest can be moved to the parameter window by a drag-and-drop operation that originates at the toolchest band and ends at the desired band well.

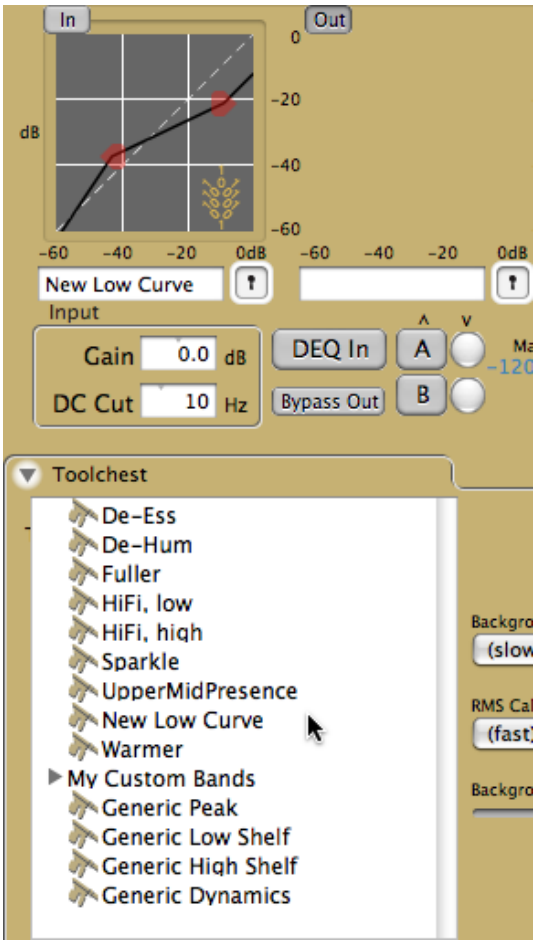




Moving a Band to the Band Toolchest

Bands in the parameter window can be moved to the toolchest by a drag-and-drop operation that originates at the desired band well and ends at the desired toolchest location. If the drop destination drawer has an item with the same name, a warning prompt will appear asking for confirmation to replace the existing item in the drawer. Replacing will permanently remove the existing item from the toolchest and complete the move.



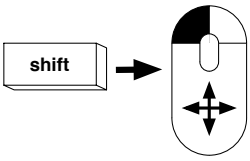


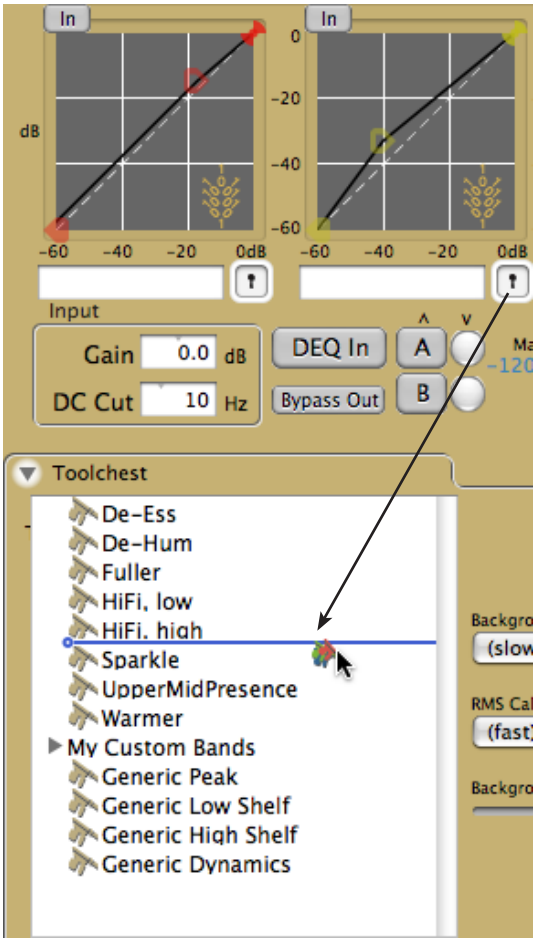
Band Note Field and Parameter Load/ Save

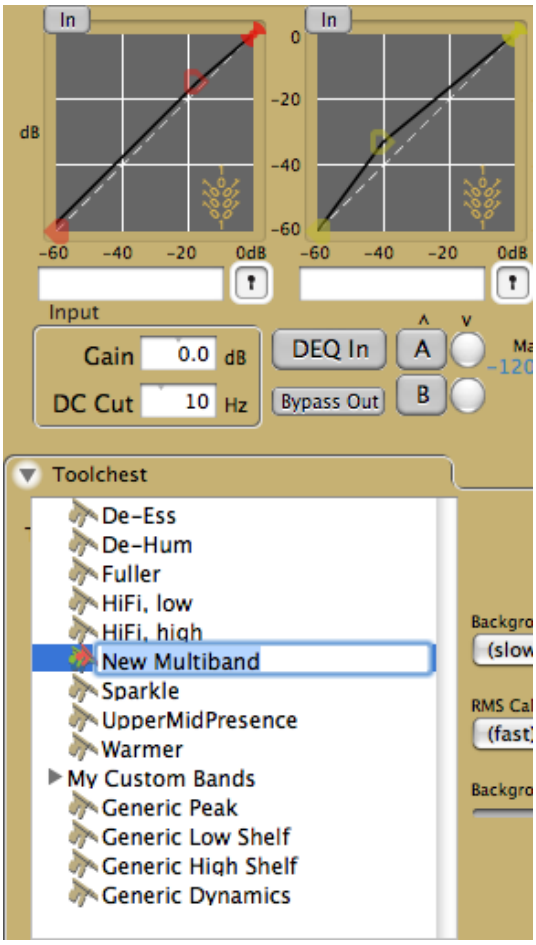
The band note field is for giving titles or notes to bands on the parameter window. The field will change when performing a drag-and-drop to the band well, but it will be cleared via A/B register load or patch load. The note field contents will not be saved with a workstation patch or project, only to the band toolchest as the band's title.

Moving All Bands to the Band Toolchest

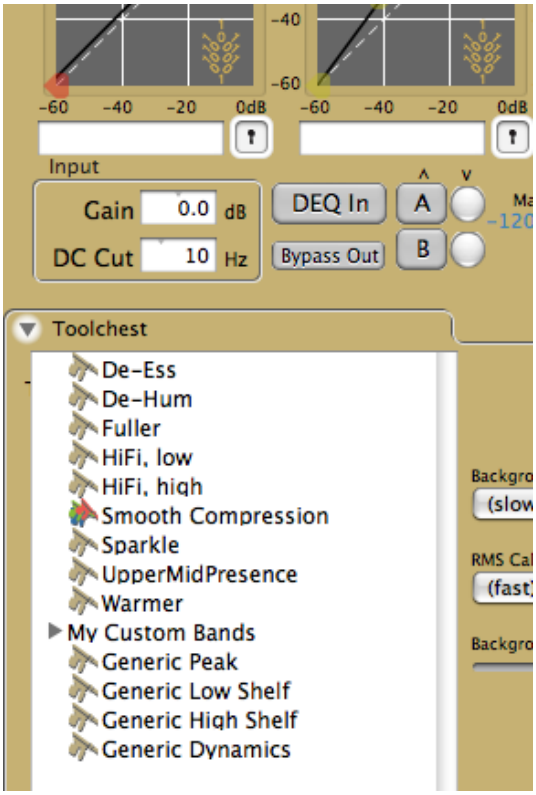
By holding down the shift key during the drag-and-drop operation, all bands in the parameter window will be transferred instead of one.







Completing the drag-and-drop will prompt for a name to give this multiband item. Type in the new name and end the entry with tab or return.



Moving All Bands to the Parameter Window

A multiband item in the Band Toolchest functions the same as a single band item. Drag-and-drop a multiband item from the Band Toolchest to any Band Well to load the multiband contents into the parameter window. Note that the parameters for the input processor and peak limiter will not change after the operation, as the multiband item does not contain those parameters.

Persistent Store of Band Toolchest

The band toolchest file is read when DynPEQ is instantiated, and it is written when the plugin is shut down. The location of the band toolchest file is

$(HOME)/*Library*/*Preferences*/*com.wholegrain.ds.dpeqbands.plist*,

where $(HOME) represents the filesystem location of the home icon in a Finder window. This file can be restored from a system backup should the file become missing or damaged. If the file is missing, such as on the first time DynPEQ is instantiated on your system, the file will be initialized to a default set of bands, which is shown in the toolchest picture above.

Quartet DynPEQ is designed so that multiple instances of the plugin should be able to safely share the band toolchest file. However, if there are multiple instances of workstation software running simultaneously on the same computer home, there is the possibility that band toolchest changes made on one workstation can be overwritten with changes from another workstation instance. Please keep this in mind if your workstation host is a server to multiple users. In this case, each user should have a unique home directory in order to avoid this conflict.

Patch Store

The lower portion of the toolchest window is the patch store. The patch store is for saving and recalling the operational parameters of the DynPEQ plugin. The patch store is initialized to empty for newly instantiated plugins. Parameter configurations, or patches, can be sequentially added to the store. When the workstation project is saved with an active DynPEQ plugin, all configurations in the patch store are saved with the project file. When that project is recalled, Quartet DynPEQ will be started with the contents of the patch store at the last project save. The store shows no more than five patches at a time, but the view can be adjusted upwards and downwards to cover all of the store's patches.

Patch Load and Patch Add/Replace

Associated with each item shown in the patch store is a load button and an add/replace button. These buttons look very similar to their counterparts for the A/B registers in the parameter window, and their function is similar as well. The square button loads a patch, and the round clear button saves a patch and turns blue when the current DynPEQ parameters matches the patch. The patch load button will show the sequential number of the patch if there is a patch in that row. If there is not an active patch in the row, the load button will be blank and inactive.

The patch add/replace button will replace the patch in the row if it contains an active patch, after prompting for confirmation. The add/replace button will append a new patch to the store if its row does not contain an active patch. The extra add/replace button at the bottom is for adding a new patch when all rows are occupied and should remain undisturbed.

Patch Remove

To the right of the load and add/replace buttons are small buttons for deleting a patch from the store. After prompting for confirmation, the corresponding patch will be removed from the list and the remaining patches reordered.

Patch Title

To the left of the buttons are text fields for entering a patch title. Click on a field to enter or edit a title, and press tab or return when done, for the title will not be officially recorded until the focus ring disappears from the field. The patch titles are saved and restored with their respective patches in the workstation project file.

Store Capacity

At the bottom of the window is a numeric field which shows the number of active patches in the store. There is no hard limit to the number of patches that can be in the store, only the limitations of system resources. Recall that the store is saved with the project file, though, and one should keep only the patches that are deemed necessary for that project.

Patch and Page Up/Down

At the far left of the patch store are buttons for adjusting the range of patches that are visible. Five rows of patches make up a page in the patch store view. The patch up button, with a single up-arrow, will move the range one patch towards the top of the list, in the direction of lower patch numbers. Similarly, the page up button, with two up-arrows, will move the range up by five. There are also patch down and page down buttons, with one and two down-arrows respectively, that move the range in the opposite direction, towards the bottom of the list.

Background Parameter Window

With the volume of runtime interactive graphics elements it contains, the parameter window takes a considerable amount of CPU resources when the elements are active. In the interest of being a good computer citizen, especially when there are multiple instances of DynPEQ active, the interactive elements of the parameter window by default will be inactive when the window is not at the top of the screen. The elements inactivated are the input RMS-to-frequency response mapping--the shaded colors in the coarse parameter views, the two peak meters, and the limiter hit indicator. The maximum peak compiler will still continue to operate while the window is inactive, and the maximum peak field will update once the parameter window regains its status as the main input destination.

If it is desired to have the interactive graphics elements continue to work when the window is in the background (and the host computer is sufficiently fast), set the background parameter window selector to 'Graphics active (slow).'

RMS Calculation

The RMS calculation selector covers an issue of runtime behavior that has a background effect on the audio performance of DynPEQ. The issue it addresses is the input RMS level measurement for multiple channels and how it is carried out. Multiple input channels are converted into a single RMS measurement which appears on the coarse dynamics view. The first option, '(fast),' sums all input channels (into one bundled input signal) and then calculates the RMS level on the sum signal, which takes less processor time to calculate. The other option, '(slow),' calculates the RMS level on all input channels and then sums the levels. This option is slower, but results in a level calculation that is not sensitive to phase differences between channels.

Background Color

The background color slider, as the name suggests, can be used to adjust the parameter window background color for the purpose of control visibility and overall aesthetics.

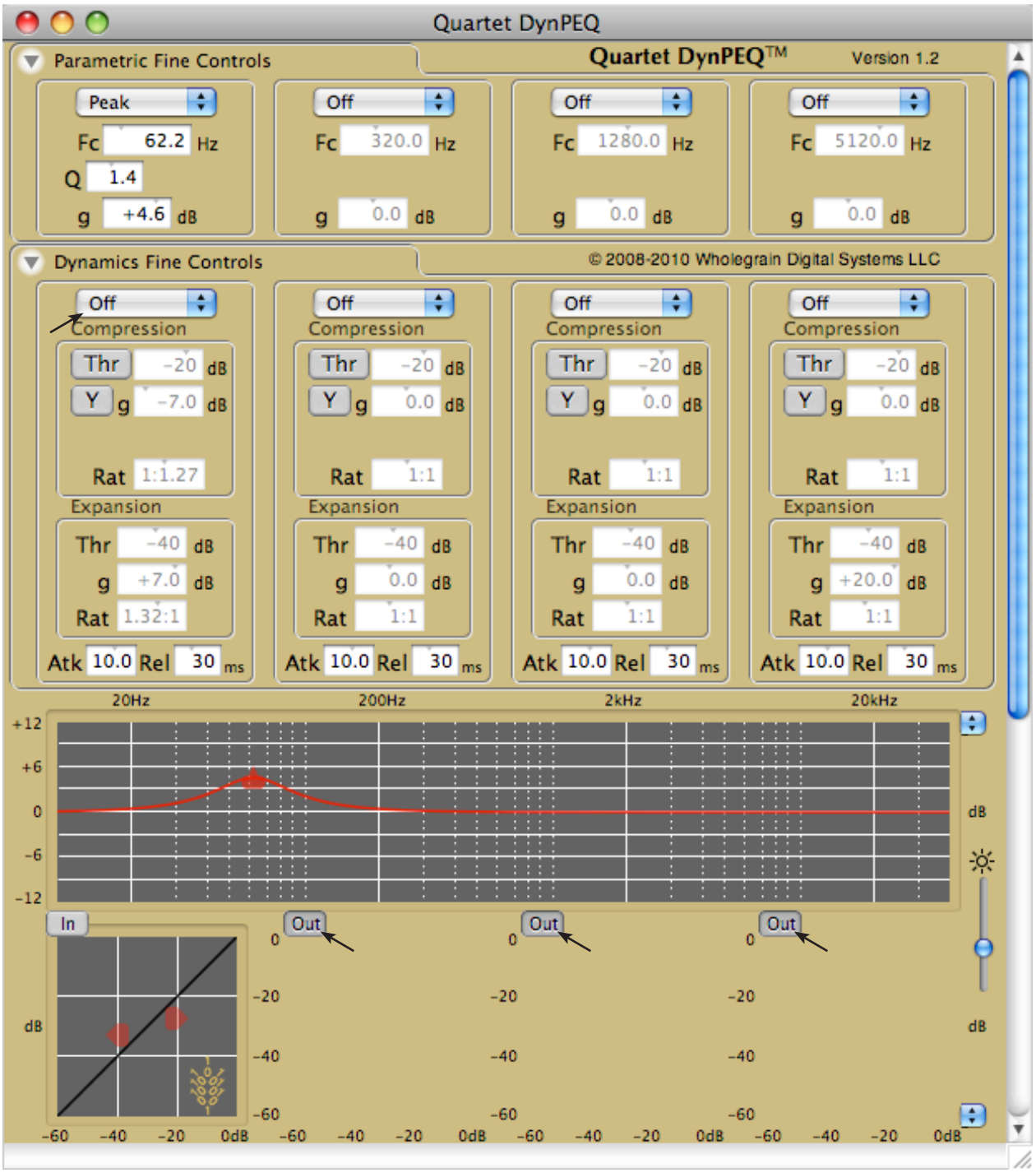
Signal Processing and Band Configuration Tutorial

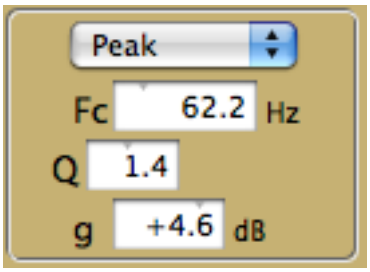
Finally, the fun part!

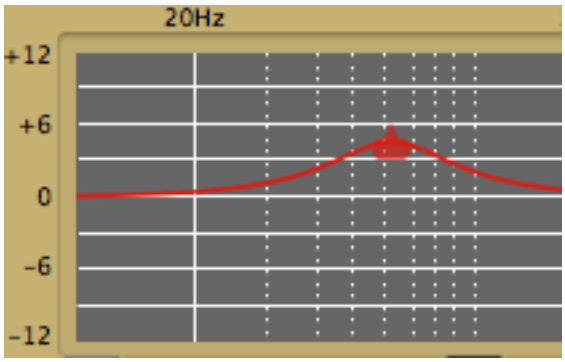
Band Operation: Tuning

To begin the investigation of band operation, bypass all bands in the plugin except one. To concentrate on the tuning aspects of a band, set the dynamics type selector to off.

With the dynamics off, this band will operate as a normal parametric equalizer. Using the fine or coarse tuning control, bring the value of 'g' away from zero and investigate the filter type options. The peak selection is the presence parametric filter. The value of 'Fc' is the center frequency, or the crest of the peak along the x axis of the coarse view. The value of 'g' is the boost or cut at the center frequency, or the maximum displacement along the y axis of the coarse view. The value of 'Q' is the sharpness of the peak. Higher Q values result in a sharper, more abrupt peak.

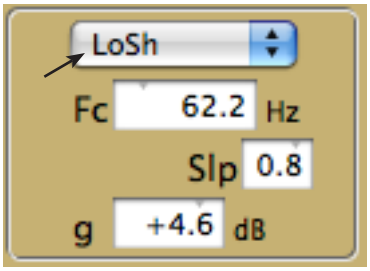


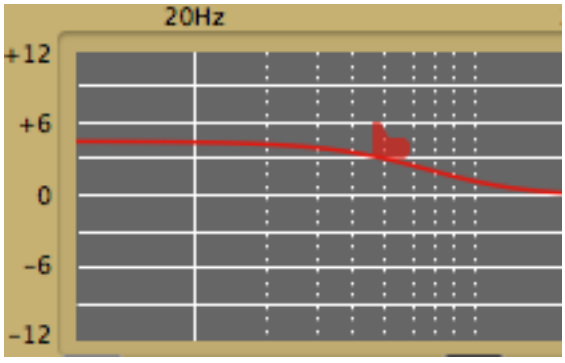




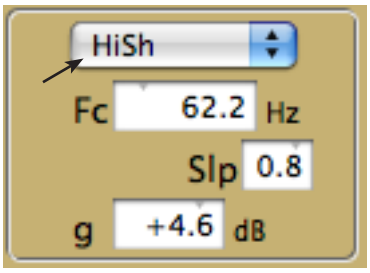
Dragging the bead in the coarse tuning control adjusts the cutoff frequency (x axis) and boost/cut (y axis). The auxiliary parameter for the bead, controllable by either left-mouse-hold-scroll or shift-left-mouse-drag, is the Q of the peak.

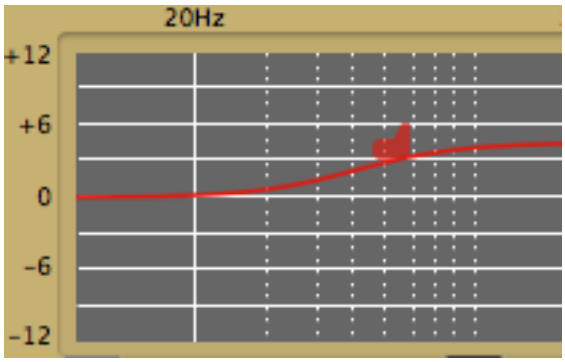
Now select the low shelf type, abbreviated to 'LoSh' in the selector. The value of 'Fc' becomes the cutoff frequency, or the corner point where the shelf transitions between 0dB and 'g,' the boost/cut level at DC (0 Hz). The 'Q' control disappears and is replaced by 'Slp,' which represents the transition slope. Its value can be between 0 and 1, where 1 is the steepest transition slope. 'Fc' and 'g' remain controllable by dragging the bead, and the transition slope becomes the auxiliary parameter for the bead.



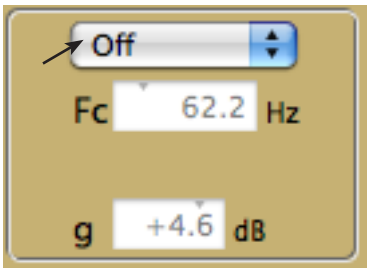


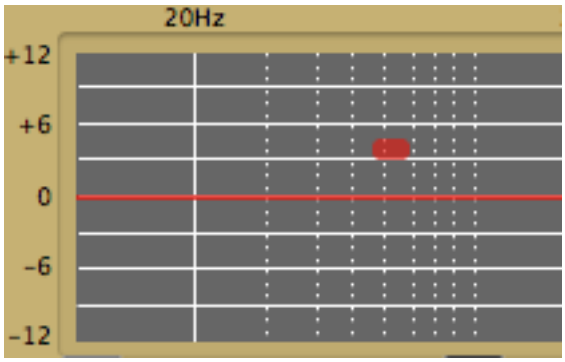
Now select the high shelf type, abbreviated to 'HiSh' in the selector. 'Fc' remains the cutoff frequency and 'g' remains the boost/cut level, but the location of the boost/cut level is now the Nyquist frequency. The meaning and control of the 'Slp' parameter is unchanged.





Now select 'Off' for the tuning type. The 'Slp' parameter disappears, and the 'Fc' and 'g' fields are grayed out, which means their slider-text controls are inactive. The bead on the coarse adjustments can still be dragged around its field, however.

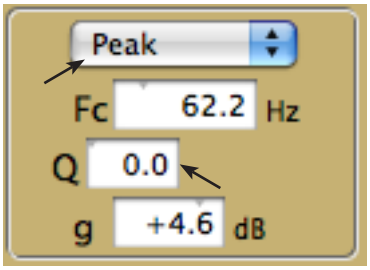


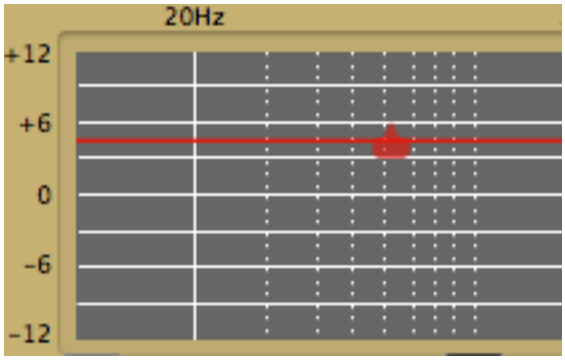


Note two things about the coarse adjustments. One, the bead changes its shape to reflect the tuning type selected. Two, and most important, the solid color line in the field represents the frequency response of the filter that the tuning parameters describe.

Switch the tuning type back to ‘Peak’ and adjust the value of ‘Q’ downwards, noting that the band of the filter widens as the parameter goes down. Stop when the value of ‘Q’ reaches zero and note that the frequency response becomes a flat line at the boost/cut level.

The peak filter with zero Q is simply a broadband gain function. The ‘Off’ filter type is a special case of the peak filter where the applicable Q is zero and the applicable boost/cut is 0dB.

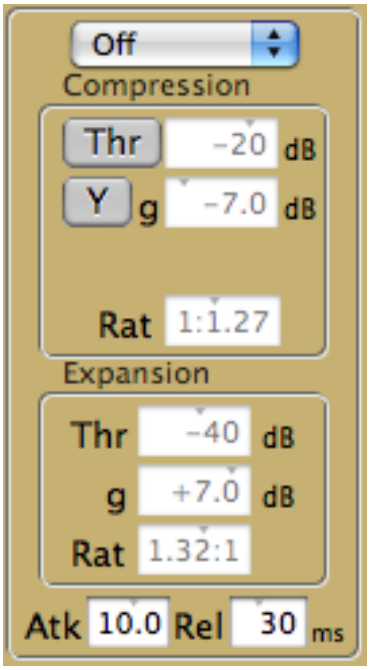


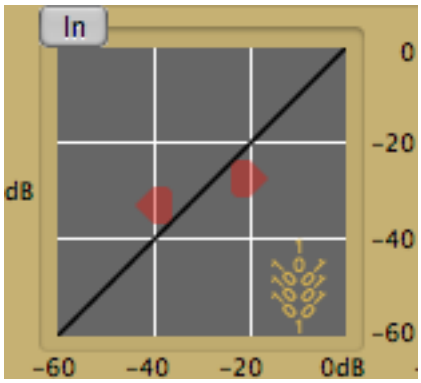


Before moving on, play some source material through DynPEQ and experiment with filter types, connecting the filter frequency response with the way in which the source signal is modified.

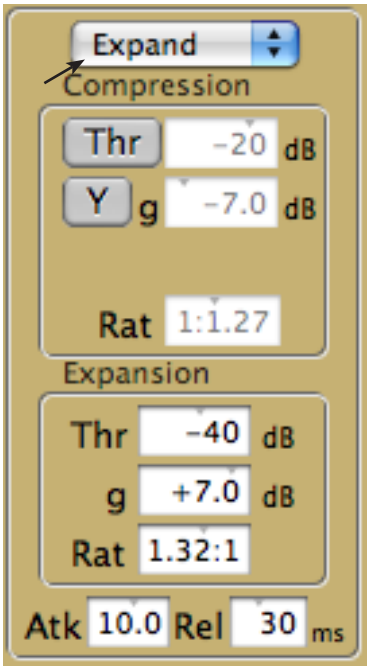
Band Operation: Dynamics

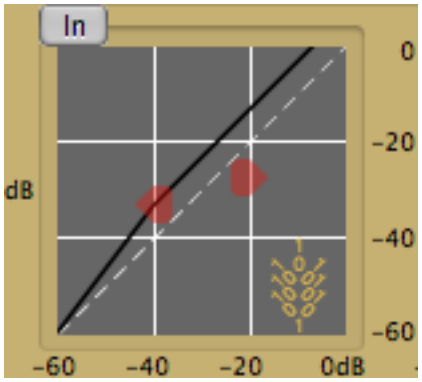
Switch the tuning type back to ‘Off’ and begin the investigation of dynamics operation. Leave the dynamics type at ‘Off’ and note that the fine adjustments are grayed out for the compression and expansion categories. There are two beads in the dynamics coarse field. The bead for the expansion category points to the left, and the compression bead points to the right. The compression bead will always be to the right and above the expansion bead. In the coarse field, the x axis represents input level and the y axis represents output level. There is a diagonal dashed line in the field which represents unity gain, or input level and output level being equal. Move the two beads away from unity gain and note the black line does not move along with them and stays at unity gain.





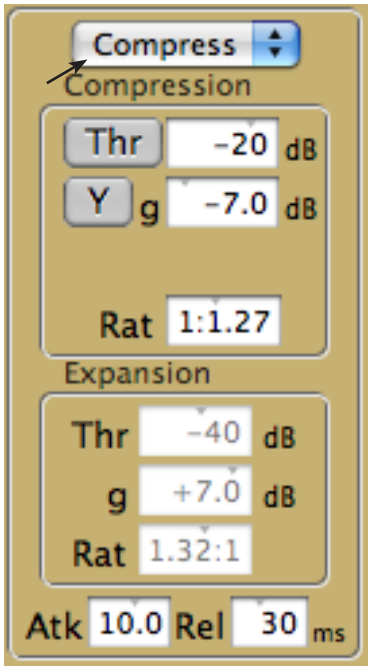
The black line is the dynamics curve, the mapping of output level to input level. Now set the dynamics type to 'Expand.' At this setting, the expansion fine adjustments become active and the coarse view shows that the dynamics curve meets the expansion bead. At the expansion only setting, the slope above the expansion bead will be unity and will follow the unity gain line. The 'Rat' parameter is the expansion ratio and affects the slope of the dynamics curve below the expansion threshold, which is the 'Thr' parameter. The expansion ratio is the auxiliary parameter of the expansion bead, controllable by left-click-hold-scroll or shift-left-drag.

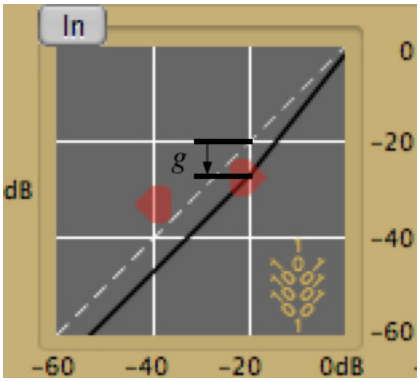




The value of the expansion threshold applies to the input level, or the x axis of the coarse view. Adjusting the expansion threshold in the fine adjustments moves the bead along the unity gain line. The 'g' parameter is the boost/cut at the expansion threshold, so the effective output level at the expansion threshold is the threshold plus boost/cut. Adjusting the expansion boost/cut alone moves the bead along the y axis.

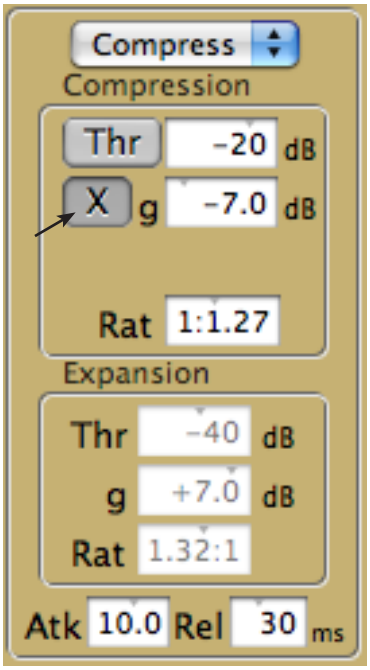
Setting the dynamics type to 'Compress' grays out the expansion fine adjustments and activates the compression adjustments. Control of the dynamics curve passes from the expansion bead to the compression bead. At the compression only setting, the slope below the compression bead will be unity and will follow the unity gain line. The 'Rat' parameter is the compression ratio and affects the slope of the dynamics curve above the compression threshold, the 'Thr' parameter. The compression ratio is the auxiliary parameter of the compression bead, controllable by left-click-hold-scroll or shift-left-drag.

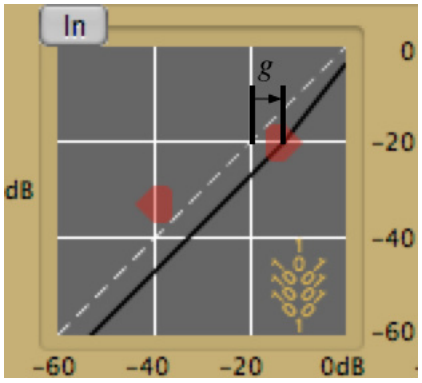




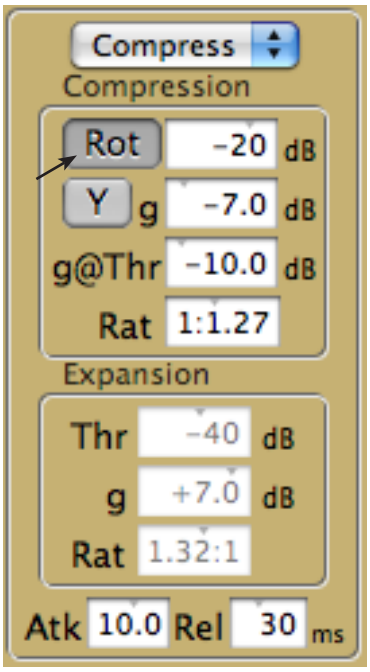
Note the button labelled 'Y.' This button selects the axis on which the threshold boost/cut offset is applied. When the button is set to 'Y,' the threshold is offset from the unity gain line at the value of 'Thr' along the y axis. The offset is shown in the figure above. The offset will not be depicted as such on the live parameter window.

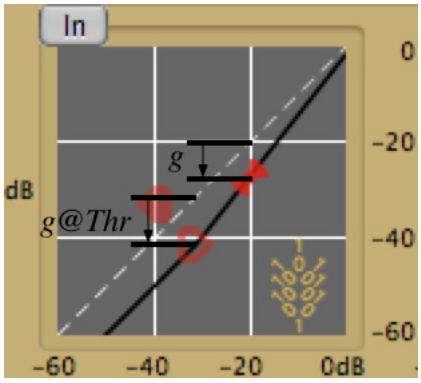
Now left-click the button, which will give it the label 'X.' This button state indicates the threshold is offset from the unity gain line along the x axis. The offset is shown in the figure below. Compare the offsets between the x and y axis and adjust the 'g' parameter to note how the button affects threshold movement.





Now reset the button to the 'Y' setting and click on the button just above labelled 'Thr.' In the coarse display, the compression threshold bead is replaced by what is called a rotation point, hence the new label 'Rot' on the button. A new parameter becomes visible with the label 'g@Thr.' This stands for gain at threshold. How the compression curve is determined in this case is as follows. The 'Rot' and 'g' parameters (offset in the direction specified in the X/Y button) now control the location of the rotation point. The compression ratio specifies the slope of a line that intersects the rotation point. The compression threshold is placed where this compression line intersects the boost/cut offset from the neutral gain line.



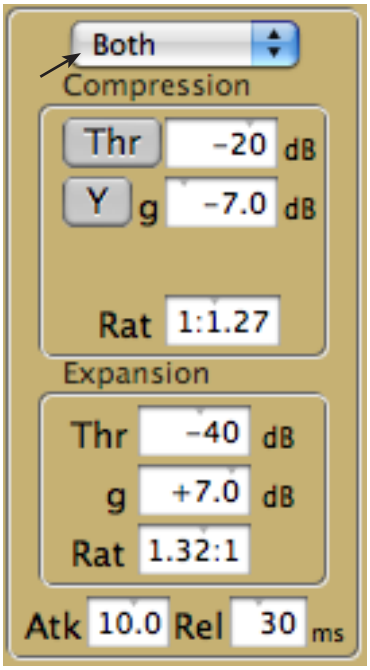


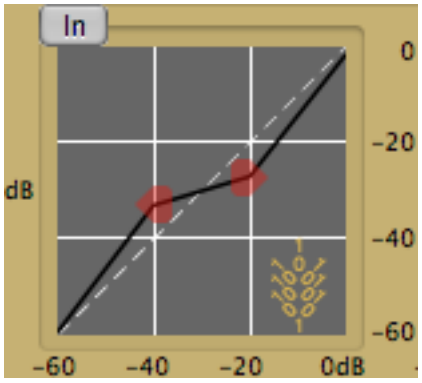
Adjust the compression ratio and note how the rotation point acts as a pivot that the compression line passes through. It is important to note that the compression ratio in this configuration cannot be 1:1, for then there is no way to determine the location of the compression threshold.

Now adjust the 'g@Thr' parameter and note that the compression threshold, which is a hollowed-out bead when the rotation point is present, moves along the seemingly fixed compression line. Note that if the value of 'g@Thr' becomes greater than 'g' in this case, the virtual threshold moves beyond the rotation point, but the slope and intersection point of the compression line will not change.

The compression bead can still be manipulated by clicking on it. Dragging the bead shows more about the function of the rotation point, that it is indeed a fixed pivot point for the compression line. In addition, the rotation point can be clicked and dragged to a new location. When this happens, the gain at threshold will hold at its value.

Now reset the mode back to the more familiar 'Thr' and set the dynamics type to 'Both,' which activates both the expansion and compression points. Note that the dynamics curve obeys both beads, and that the two points are connected by a straight line.



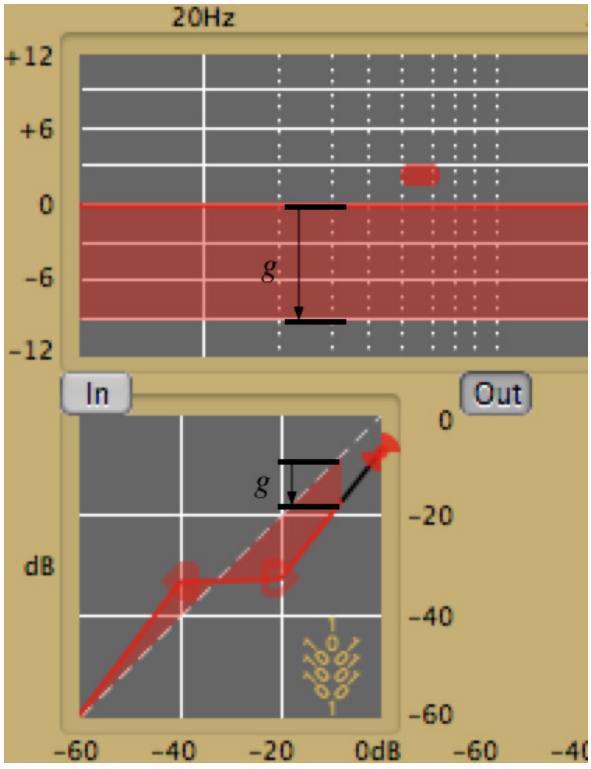


The black line in the coarse view is the dynamics curve, the mapping of input levels to output levels. The effective gain is the ratio of the output level and the input level, and this is the boost/cut to apply to the respective parametric stage.

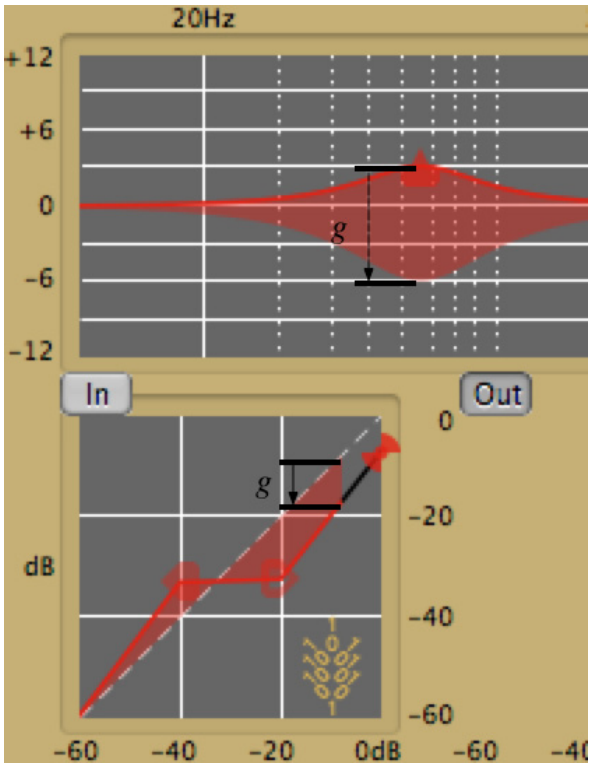
Dynamic Parametric Equalization

Play some source material through the plugin and not only listen for the audio effect but watch the coarse display for visual feedback on how the dynamic processing works. Start with the coarse dynamics view, where the compression curve is the black line. The x axis represents input level, and the coarse dynamics view fills in the black line with a solid color line to the point of the current input RMS level measurement. From the far left to the current input level, the path from the dynamics curve to the unity gain line is shaded with the band color. The far right edge of this shaded area is the current boost/cut applied to the input audio signal.

Change the tuning type selector to 'Off.' Note that there is also a shaded area in the coarse tuning view. This shaded area extends away from the solid color frequency response line. The distance from the solid line to the shaded edge along the y axis is the gain applied to the signal at a particular spectral frequency, which in this case is equal to the boost/cut level from the coarse dynamics view. The y axis scaling for the two views is different, which is why the distances do not match, but the distance within the context of the scaling is the same. Arrows indicate the boost/cut levels in question.

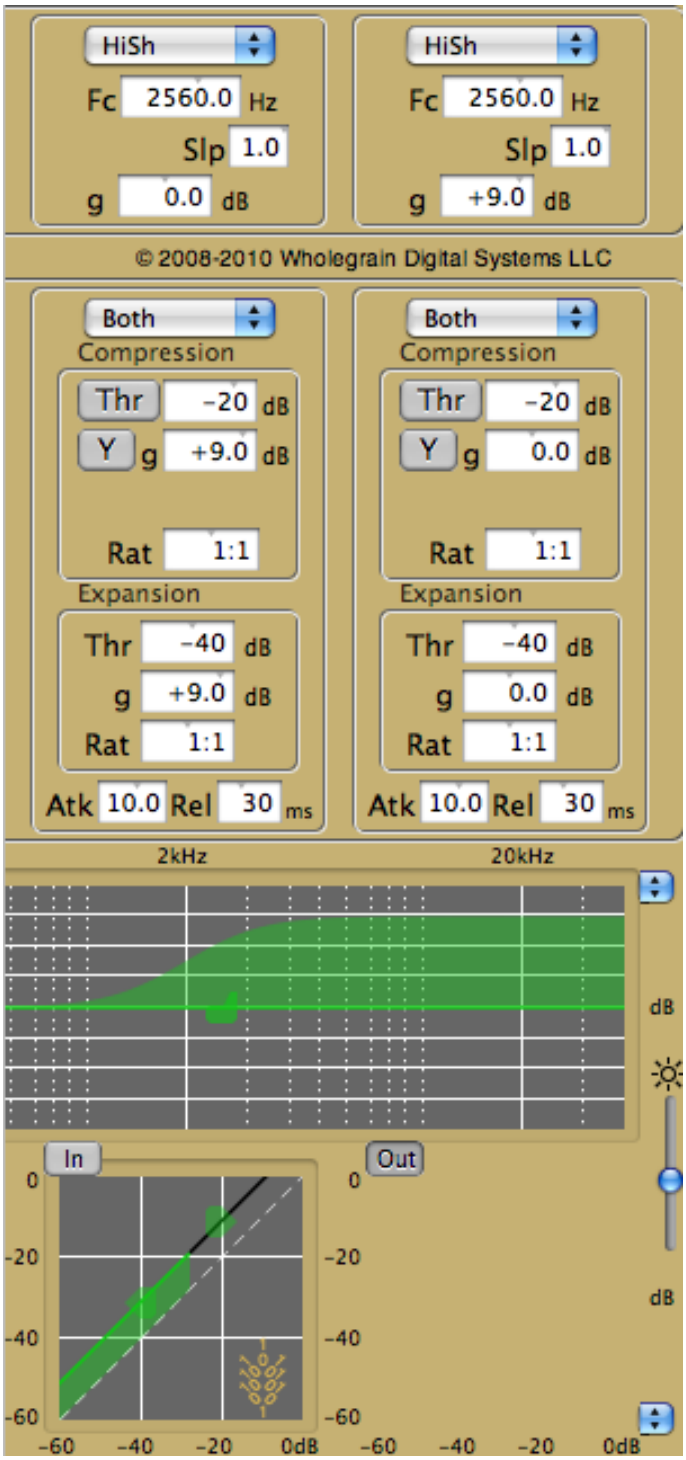


Now change the tuning type selector to 'Peak.' The frequency response of the tuning parameters change, so the black line in the coarse tuning view changes. The first principle of dynamic parametric equalization is that the dynamics curve produces a boost/cut value for its parametric filter, so the shape of the edge of the shaded area in the tuning view also changes to reflect the new parametric tuning. More difficult to notice is that the input RMS level measurement decreases. With the tuning off, the input RMS level is measured broadband, so all energy is accounted for. With the band tuned to a parametric filter, a matching filter is used on the input signal when calculating RMS level. The use of this matching filter for calculating input level is the second principle of dynamic parametric equalization.

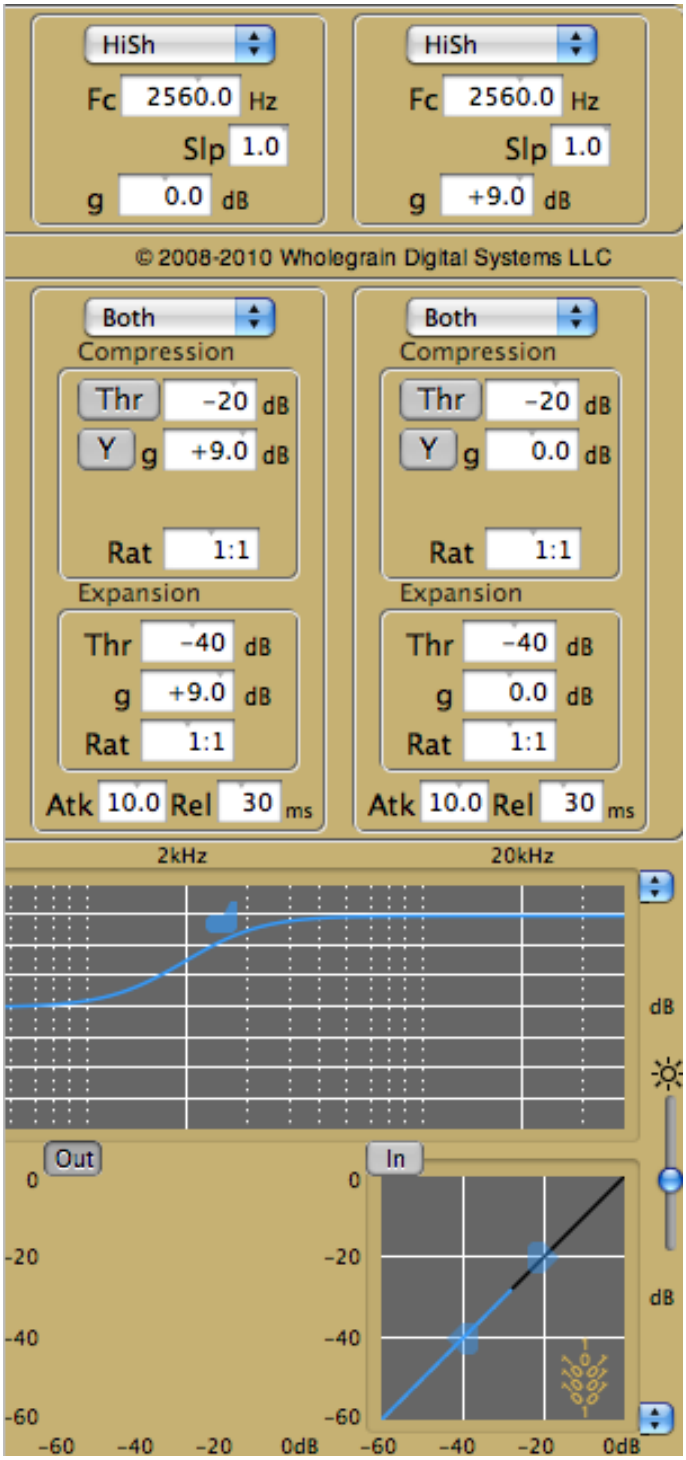


Key to the concept of dynamic parametric equalization is that the parameters labeled 'g' in both the tuning and dynamics fine adjustments affect the same thing—the boost/cut. The effective boost/cut at any time is the tuning 'g' parameter plus the current boost/cut from the dynamics curve. It is important to note that the maximum boost or cut that will be applied to one band is 24 dB. The enforcement of this maximum will be reflected in the coarse dynamics view.

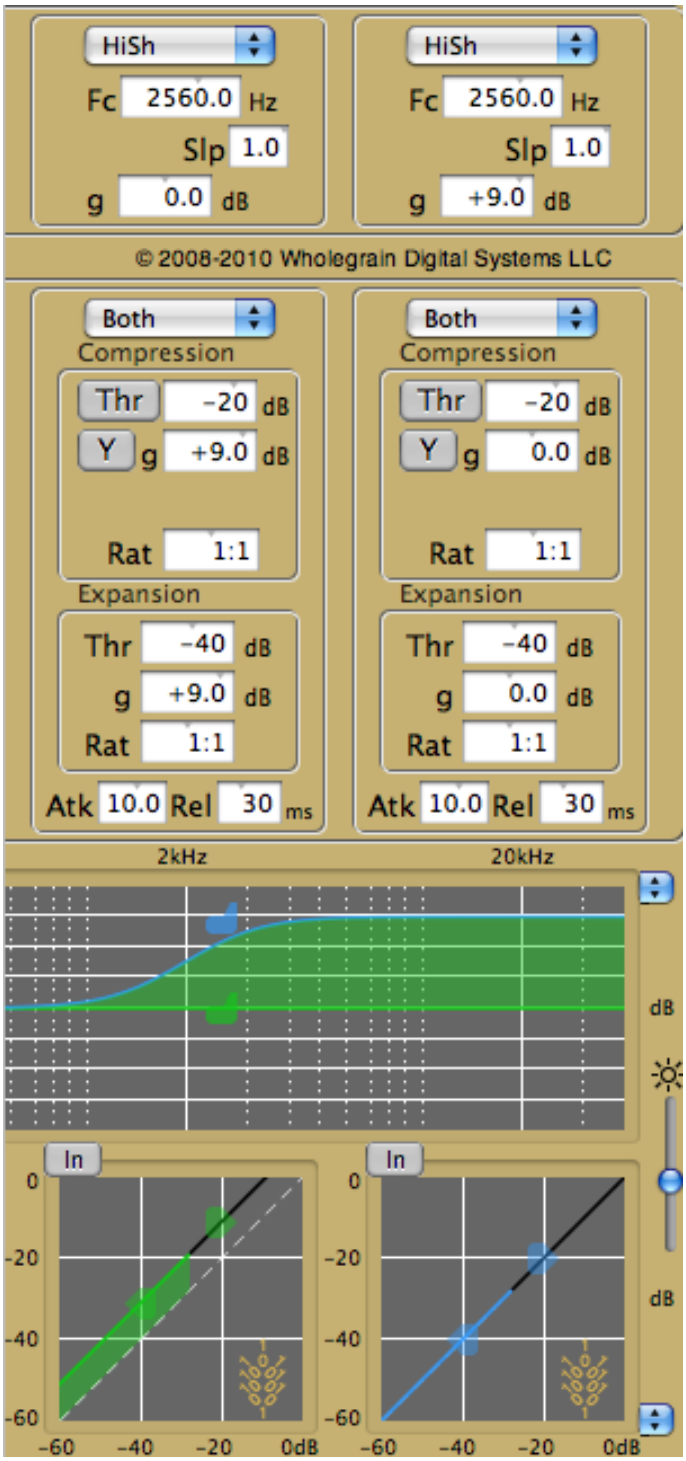
To demonstrate, the following example displays tune a high shelf in two bands to the same cutoff frequency and slope. The band on the right sets the boost/cut for the tuning parameters to 9 dB, while the band on the left sets the dynamic curve to a constant offset of 9 dB and leaves the tuning boost/cut at 0 dB. The coarse tuning view shows that the left band has a 9 dB boost/cut due to the dynamics curve (the shaded area),



while the right band has a 9 dB boost/cut due to the tuning (the solid blue line).



With both bands active, the two band states overlay on the coarse tuning display.



Note that the input RMS level reported by the two bands, the solid color line in the dynamics coarse view, is the same value. This is because the input RMS filter for the two bands is equivalent. The tuning of the input RMS filter is not dependent on the 'g' parameter—just the center/cutoff frequency and Q/slope. This is in contrast to the screen shot on page 5, where the input measurements for all active bands are different.

The input RMS level is measured with the help of an attack/release averaging filter. The attack and release times for each band are specified with the 'Atk' and 'Rel' parameters of the dynamics fine adjustments.

Interaction with the Host Workstation

Storage in the Band Toolchest

When a single band is saved or loaded via the band toolchest, the following parameters are transacted.

Center/cutoff frequency
Q (for peak)
Slope (for low and high shelf)
Tuning boost/cut
Filter Type
RMS attack time
RMS release time
Expansion threshold
Expansion boost/cut
Expansion ratio
Compression threshold
Compression boost/cut
Compression ratio
Compression gain at threshold (for rotation point)
Compression boost/cut axis (Y/X)
Compression rotation point/threshold switch
Dynamics type

When a single band is transferred into a band well, the band bypass button will be set to 'In' and that band will be active. A multiband toolchest item contains the above parameters for all four bands along with their band bypass states when the item was last saved.

Storage in the Patch Store

When a patch is saved to or loaded from the patch store, the following parameters are transacted.

Band toolchest parameters for all bands
Band bypass for all bands
Input gain
Input DC block cutoff
Output gain
Limiter level
Limiter release time

All patches in the patch store, including their titles, will be saved and restored with the host workstation project. In addition, the following non-patch parameters will be transacted with the project file.

Coarse display background brightness
Coarse tuning scaling
Coarse dynamics scaling
Processor bypass
Limiter bypass
Background window state
RMS calculation method
Open/closed states of collapsable segments
Parameter window background color
Parameter window level (from about window)
Parameter window screen position
Parameter window size

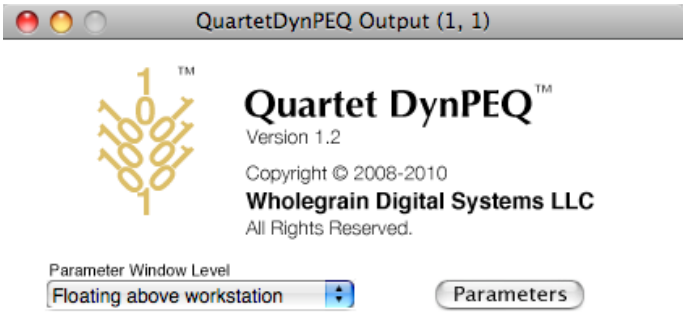
This means that the A/B registers, peak monitors, and limiter status will not be saved in the workstation project.

Caveat on Restoring Dynamics Parameters

Workstation software interacts with DynPEQ by sending individual parameter values and not parameter groups. The processing of dynamics curve information prevents the creation of a curve where a segment has negative slope--this is why the compression bead should always be to the right and above the expansion bead. Since the plugin has no guarantee of receiving parameters in a specific order (or, for that matter, receiving a complete set of parameters), it is possible (though rare) that a compression or expansion point may be moved away from the location specified in the patch or toolchest band. When this happens, the course of action to take is simply to reload the band or patch.

About Window

With most audio workstations, the parameter window is separate and detached. If this is the case, the workstation action that brings up parameter displays for its plugins shows a second window for Quartet DynPEQ. It is called the about window, and while most of the window contains information about the plugin, the window does contain two controls.



Parameters Button

The button to the lower right displays the parameter window. It can be used if the parameter window has been dismissed or is at the back of the window stack. Note that for some workstations, having the about window and parameter window displayed at the same time can slow the reaction time of both windows. To this point, this issue has not been resolved. It is best practice to dismiss the about window using the red button in the upper left corner once the parameter window settings are made.

Parameter Window Level

The parameter window competes with other windows in the workstation project for visibility. If the work routine requires accessing the parameter window only on occasion, it should be sufficient to leave the parameter window on the base level of the workstation, which is the default for the initial instance of DynPEQ. If, on the other hand, the routine requires accessing and referencing the parameter window often, the parameter window level selector allows the option to raise the display level of the parameter window above the workstation windows, so that the parameter window will 'float' above the workstation level. If this floating window level obscures important elements of your project to the detriment of workflow, the parameter window level selector can then be reset to return the parameter window to the workstation base level.

Operation Tips

The maximum peak indicator can be used to record the highest level encountered with a source program and dynamic parametric equalizer settings. To attain a setting that will adjust this peak to 0 dB, or the highest setting without encountering a limiter hit, one may wish to adjust the input level to accomplish this. Adjusting the input level, however, cannot guarantee this unless there are no dynamics set in the plugin; that is, all of the dynamics curve lines are the same slope as the unity gain guide. The way to accomplish this is to set the output gain instead. For example, if the indicator after the program reads +1.2 dB, reducing the output gain by 1.2 dB should avoid a limiter hit when the program is played again, assuming the other settings are not changed. Note, however, the peak indicators will still indicate values over 0 dB, as the peak measurement is made prior to output gain.

The DC block filter is for removing a DC component in the input signal. A DC component can bias the RMS measurements if the band tuning type is low shelf, peak with a Q value of zero, or off. While it is possible to set the DC block cutoff all the way down to 1 Hz, this setting will make the DC block filter slow to respond to significant DC bias and may pass low-frequency bias drift. It is best to set the DC block cutoff to as high a value as is comfortable.

The highest center or cutoff frequency allowable is 40,960 Hz. However, if the sample rate processed by the plugin is 48 kHz or 44.1 kHz, the maximum frequency becomes 20,480 Hz. The maximum frequency in the coarse tuning display is 40,960 Hz regardless of sample rate. If the Nyquist frequency (one-half the sample rate) is less than the maximum of the coarse display, the frequency response at the Nyquist frequency is plotted out from Nyquist rightwards. This can look odd for a low sample rate and a peak filter with a high center frequency.

There is no 'best' way to make band adjustments, but a good starting point is to apply a static equalizer band to spots in the spectrum that can use help. Drag-and-drop a 'Generic' band type from the band toolchest for this. If the band adjustment is not all to satisfaction, activate the dynamics for the band and experiment with compression and expansion.

The parameter window can take much real estate on a small screen. The screen can be resized using the lower right drag element that is present on many Mac OS windows. With both fine control views collapsed, it is still possible to adjust all tuning parameters via the coarse beads (both dragging and scroll wheel) and the remaining exposed controls.

Note that there are no channel-specific controls, yet this is a multi-channel plugin. The RMS level calculation is designed to draw equally from all channels to make a single control signal, and the DynPEQ filters apply the control signal equally to all input audio channels. While this plugin can alter the level balance between areas of

the audio spectrum, a single instance cannot alter the balance between channels. If the workstation allows, multiple mono instances of Quartet DynPEQ will operate independently on their assigned channels.

The DynPEQ filters are designed to dynamically modify the boost/cut with a minimal amount of audible artifacts. This means that making sudden and large changes to the other tuning parameters--frequency, Q, or slope--may lead to an audible 'tick' sound. This cannot be avoided.

Operational Issues

The following issues have been mentioned in previous sections, and they are repeated here for your information.

For some host workstations, having both the about window and parameter window displayed at the same time can occasionally slow the reaction time of both windows. To this point, this issue has not been resolved. When clicking on a parameter window control and nothing seems to happen, the click appears to be lost in the system, and the course of action to take is clicking on the parameter window again and moving the mouse around, which should clear the action of the previous click and re-focus the window interface. It is best practice to dismiss the about window using the red button in the upper left corner once the desired settings on the about window are made.

Workstation software connects to DynPEQ by sending individual parameter values and not parameter groups. The processing of dynamics curve information within the plugin prevents the creation of a curve where a segment has negative slope--this is why the compression bead should always be to the right and above the expansion bead. Since the plugin has no guarantee of receiving parameters in a specific order (or, for that matter, receiving a complete set of parameters), it is possible, though rare, that a compression or expansion point may be moved away from the location specified in the patch or toolchest band. When this happens, the course of action to take is reloading the band or patch.

Quartet DynPEQ is designed so that multiple instances of the plugin should be able to safely share the band toolchest file. However, if there are multiple instances of workstation software running simultaneously on the same computer home, there is the possibility that band toolchest updates made on one workstation can be overwritten with updates from another workstation instance. Please keep this in mind if your workstation host is a server to multiple users. In this case, each user should have a unique home directory in order to avoid this conflict.

The following issue is not mentioned in previous sections, and it is recorded here as an issue that is known to us and is in the process of resolution.

Quartet DynPEQ's parameter window acts as an adjunct to the plugin, as a plugin to the plugin in a manner of speaking. The workstation software is not directly aware of its presence. As such, some of the workstation keystroke commands that will bypass other plugins may not bypass the parameter window. So far, the solution involves blinking the parameter window off the screen and back on. While the parameter window is not visible, the keystroke is redirected to the workstation. However, if the toolchest drawer is open, this keystroke redirection may not seem to work at all. If this happens, one remedy is to close the toolchest, but this behavior may happen again when the toolchest is reopened. A more permanent remedy is to click a workstation window or the about window (if it is open) and then return to the parameter window. We are working with workstation engineers in coming up with a comprehensive solution that does not involve the parameter window blinking and that supports the toolchest being open.

Reporting Problems

Upon encountering an anomaly in the plugin operation or user interface, it is best to document the events around the issue before sending in a report. Most importantly, determine whether the problem is repeatable by attempting to duplicate the sequence of workstation and plugin operations that lead to the issue. If our service personnel are able to re-create the problem in the lab, the problem is much more likely to be resolved.

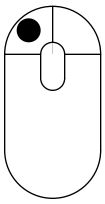
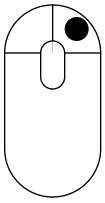
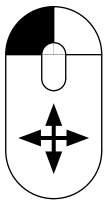
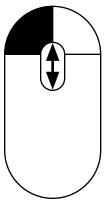
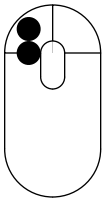
If the problem is with the processed sound from DynPEQ, it is best to capture the parameter settings and include them with the report. There are three way to do this. One, save the project with the DynPEQ parameters and send in the project file. Two, use the MacOS application /Applications/Utilities/Grab to obtain a screenshot of the parameter window (the menu item to do this is Capture->Window). Three, label the bands something like 'problem band 1,' 'problem band 2,' etc., move the bands over to the band toolchest, quit the plugin (which saves the toolbox file), and send in the toolbox file

$(HOME)/*Library*/*Preferences*/*com.wholegrain.ds.dpeqbands.plist*,

where $(HOME) represents the filesystem location of the home icon in a Finder window.

If it is necessary to send in a sound file for DynPEQ input, please keep its length to a minimum, no more than 10 seconds or so.

Appendix: Legend of Mouse and Keyboard Operations

	Press and hold shift key
	Press and hold control key
	Press and hold alt (option) key
	Followed by
	Left mouse button click
	Right mouse button click
	Left mouse click-hold-and-drag
	Left mouse click-hold-and-scroll
	Left mouse double-click