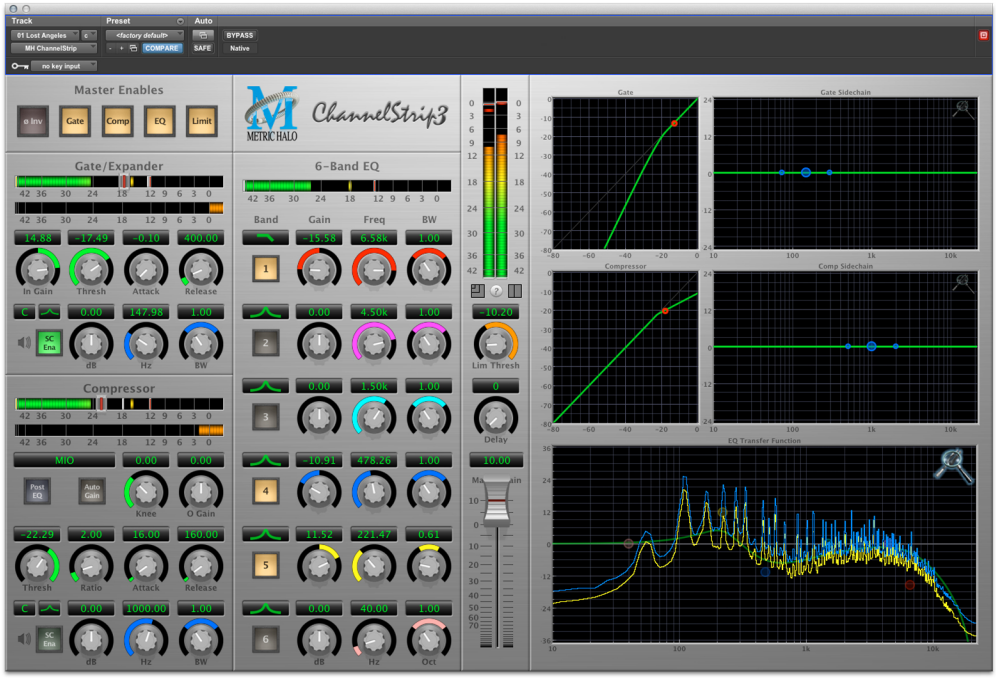

ChannelStrip 3 User's Guide

ChannelStrip 3 Users Guide

Metric Halo

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1. Introduction

Congratulations

Thank you for purchasing ChannelStrip. You have just transformed your Digital Audio Workstation into a world class mixing console. ChannelStrip provides all of the critical channel processing features you would expect to find on a top-of-the-line mixing console in a single mono or stereo plug-in. ChannelStrip combines stunning sound quality with a convenient interface designed to allow you to control all critical channel processes interactively and simultaneously - just like you would on a real console!

What is ChannelStrip

ChannelStrip is a plug-in for digital audio workstations which provides the essential basic channel processing found in the channel strip of a modern mixing console.

Processing functions include:

- Input level control
- Phase Invert
- Expander/Gate with filtered sidechain
- Compressor with filtered sidechain
- 6 band Parametric EQ
- Channel delay
- Limiter
- Advanced metering

ChannelStrip 3 has several notable new features not present in ChannelStrip 2:

- Updated and resizable user interface
- Sidechain listen
- Scalable gain reduction meters
- New “MIO” compressor character
- SpectraFoo spectragraph analysis
- Limiter
- Fully interpolated EQ section with scalable display
- Processes are automatically enabled when adjusted

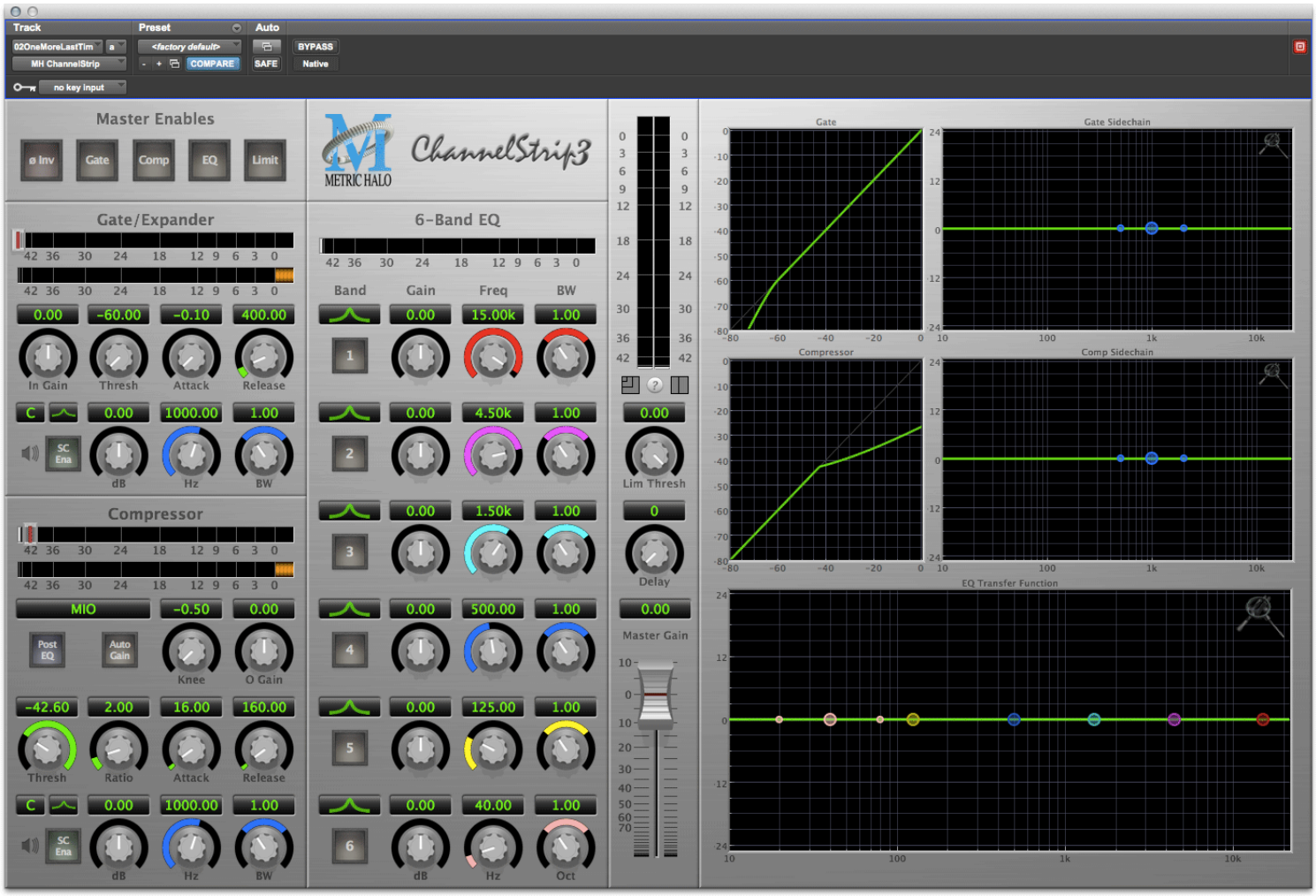

Figure 1.1: ChannelStrip's User Interface

2. Operating the Strip

As with most channel strips, ChannelStrip provides many copies of controls that are all operated in a similar manner. The ChannelStrip user interface uses a few different control elements to control all of the processing. These elements are:

Control Knob

Control Knobs are used to control the value of various continuous parameters of a process. Examples of these types of parameters include: Attack time, Release Time, Threshold, etc. There are four styles of encoders:

Figure 2.1: Swept Knob

The rings around these encoders sweep from a minimum to maximum value, normally from left to right. One exception is the compressor threshold, which sweeps from right to left.

Figure 2.2: Plus/Minus Knob

The rings around these encoders start at 12 o'clock and sweep to either side. These knobs are used for gain control, where straight up is no gain change, turning to the left cuts the signal and turning to the right boosts it.

Figure 2.3: Spread Knob

The rings around these encoders start at 12 o'clock and spread to both sides equally as the control is increased. These knobs are used for bandwidth controls.

Figure 2.4: Limiter Knob

The ring around this encoder displays the amount of gain reduction from the limiter. The display sweeps around the encoder from right to left, with a fully left display indicating 12dB of gain reduction.

You can change the value of each knob in a number of different ways. Click and drag the knob to change the value continuously. Dragging up or to the right will increase the value, while dragging down or to the left will decrease the value. If you hold down the ⌘ (Command) key when you click, you will be able to adjust the value with finer precision. If you hold the ⌥ (Option) key when you click, the knob will reset to its default value. You may also double-click a knob to reset it.

Click on the number (readout) of the knob to pop up a text entry field that allows you to type in a number directly. The popup will remain active until you dismiss it by clicking somewhere else or hitting the return, enter, tab, or ⌘. (Command + .) or ESC keys. Hit return or enter to confirm the value and dismiss the popup. Hit the tab key to confirm the value and pop up an entry field for the next control. ⇧–tab (Shift + tab) will pop up the entry field for the previous control). Hit ⌘. (Command + .) or ESC (Escape) to dismiss the popup and cancel the change.

When you enter a number into the pop up entry, you can use a couple of abbreviations: “k” multiplies the number by 1000 and “m” divides the number by 1000. So if you want to enter 16,500 Hz you can just type 16.5k.

Toggle Button

Figure 2.5: Toggle Button (Off)

Figure 2.6: Toggle Button (On)

Toggle buttons are simple on/off switches. They light up when they are on and are dark when they are off. You toggle the state of the button by clicking on it. These buttons are used to enable processor sections, select keying sources and to switch the order of processing within ChannelStrip.

Fader

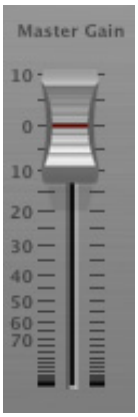

Figure 2.7: Master Fader

The fader is somewhat unique in that only one fader is used in the interface for ChannelStrip. It works in much the same fashion as the control knobs. Instead of dragging up/right or down/left to change the value, you directly drag the fader knob. The other “tricks” described for the knobs also work with the fader. The fader is used to control the master output gain of the plug-in before the limiter stage.

Filter type

Each filter band in the strip (6 EQ bands and 2 Side-chain bands) has a filter type control that allows you to choose the shape of the filter applied by that band. Each band provides 6 different types of filter shapes:

Figure 2.8: Peaking/Parametric

Peaking/Parametric – a second order bell-shaped parametric boost/cut filter. Boost/cut has a range of ± 24 dB. When the boost is greater than +15 dB the filter gains a resonant quality. The center frequency of the filter can be any frequency between 20 Hz and 20 kHz. The bandwidth of the filter is continuously variable between 0.1 octaves and 2.5 octaves.

Figure 2.9: Low Cut

Low Cut – a 12 dB/octave low cut filter with a -3dB point that is continuously adjustable between 20 Hz and 20 kHz.

Figure 2.10: High Cut

High Cut – a 12 dB/octave high cut filter with a -3dB point that is continuously adjustable between 20 Hz and 20 kHz.

Figure 2.11: Low Shelf

Low Shelf – a shelving filter that applies boost/cut to low frequencies. Boost/cut is limited to +12 dB/– 24dB. The bandwidth controls the dip/peak that is added at the end of the transition band.

Figure 2.12: High Shelf

High Shelf – a shelving filter that applies boost/cut to high frequencies. Boost/cut is limited to +12 dB/– 24dB. The bandwidth controls the dip/peak that is added at the end of the transition band.

Figure 2.13: Bandpass

Bandpass – a bandpass filter with 6dB per octave skirt on the high and low ends of the pass band. The width of the pass band can be adjusted between 0.1 octaves and 2.5 octaves and the center of the pass band is continuously adjustable between 20 Hz and 20 kHz.

You can select from these types via three different methods. Each time you click on the Filter Type control, the band will switch to the next type in the list (and wrap to the beginning when you hit the end of the list). If you click and hold the mouse button, a pop-up menu listing all of the types will appear after about 1/4 of a second. You can select the type directly from this popup menu. If you want to access the menu without having to wait, hold down the ^ (Control) key when you click or right-click.

Sidechain Routing Switch

Figure 2.14: Sidechain Routing Switch

Each sidechain routing switch allows you to control the signal sent to the sidechain input of its associated gate or compressor. By default, the level detectors in the dynamics processors key off of the signal that they are processing. Under some circumstances, you may want to use a different signal to open the gate or compress the signal. Most DAWs allow you to specify an input or bus as the source for ChannelStrip's sidechain input. The Sidechain routing switches allow you to choose the input to the level detector from the sidechain (key) input or the signal being processed. To toggle the state, click the Sidechain routing switch.

Sidechain Listen button

Figure 2.15: Sidechain Listen Button (Disabled)

Figure 2.16: Sidechain Listen Button (Enabled)

The sidechain listen button allows you to listen to the signal being sent to the gate or compressor sidechain input. This allows you to monitor the audio being routed from the key input, and hear the effect of sidechain filtering.

Compressor character

Figure 2.17: Compressor Character Switch

The compressor character controls the time constants of the compressor section. It functions identically to the Filter Type control, except there are only four choices: Smooth, Warm, Fast and MIO. See the section on the compressor for more information.

User Interface control

Figure 2.18: UI Size Control

This button switches the overall ChannelStrip user interface between small, medium and large sizes to accomodate different display resolutions.

Tooltip control

Figure 2.19: Tooltip Control

This button toggles the tooltip display. When enabled, tooltips wil be shown when the mouse hovers over a control. When the tooltip display is disabled, you may still see tooltips by holding down the **?** key and hovering over a control.

Graphs disclosure control

Figure 2.20: Graph Disclosure Button

The Graphs disclosure control allows you to show and hide ChannelStrip's display graphs. This allows you to maximize screen real-estate while still providing details on the processing when they are needed. Click on this control to toggle the visibility of the graphs. ChannelStrip will automatically make the plug-in window smaller when you hide the graphs.

ChannelStrip also uses a number of standard visual representations to give you feedback about what is happening within the processor. These elements are:

Peak Meter

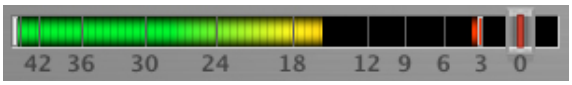

Figure 2.21: Peak Meter

ChannelStrip provides a peak-reading meter at the input stage of each processing block. The meter uses the fast PPM standard for decay time (0.9 seconds per 20 dB) and the digital PPM standard legend for calibration. On the dynamics sections (gate and compressor) a white bar is visible on top of the meter and indicates the current detector level. For the dynamics sections the processor threshold is indicated by the red threshold slider above the input peak meter. This red bar can be manipulated directly with the mouse. The top segment of the meter (above 0dB) is used as a clip indicator and is illuminated red if the input section of the processor detects an over. The clip light remains illuminated until you click on the meter. ⌥ (Option)–click any meter to reset the clip lights on all of the meters in ChannelStrip. When ChannelStrip is running in stereo mode, this meter shows the higher of the two input levels and will detect an over on either input channel.

Gain reduction meter

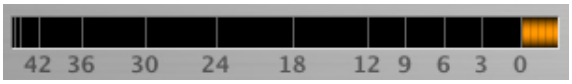

Figure 2.22: Gain Reduction Meter

The gain reduction meter, which has an orange bar and grows down from 0 dB, shows the amount of attenuation being applied by its associated dynamics processor at any given time. If you right-click or ^ (Control) click on the meter, you may set the scale of the gain reduction meter to any of the following values:

- 54 dB
- 24 db
- 12 db
- 6 db
- 3 db

Peak, RMS, VU output meter

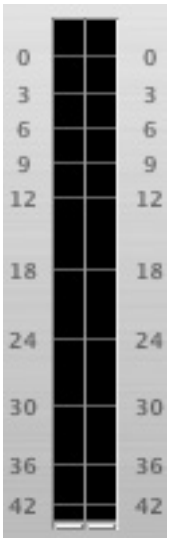

Figure 2.23: Output Meter

For the main output stage of ChannelStrip we have provided meters driven with SpectraFoo metering technology. These meters show, in addition to the peak metering provided for the input stages, RMS level and VU level. The peak level is represented by the floating colored bar, the RMS level by the solid colored bar and the VU level by the overlaid gray bar. Both the Peak and RMS level are represented with fast PPM ballistics. The VU meter shows IEEE standard 300 ms RMS average level. When ChannelStrip is on a mono insert there will be a single meter. When ChannelStrip is running in stereo mode the left meter shows the left channel output level and the right meter shows the right channel output level. The output section clip lights activate if there is an over in the output stage or in any of the processing section input stages. It is reset by clicking on the meter; ⌥ (Option)–click to reset the clip lights on all the meters.

EQ Transfer Function

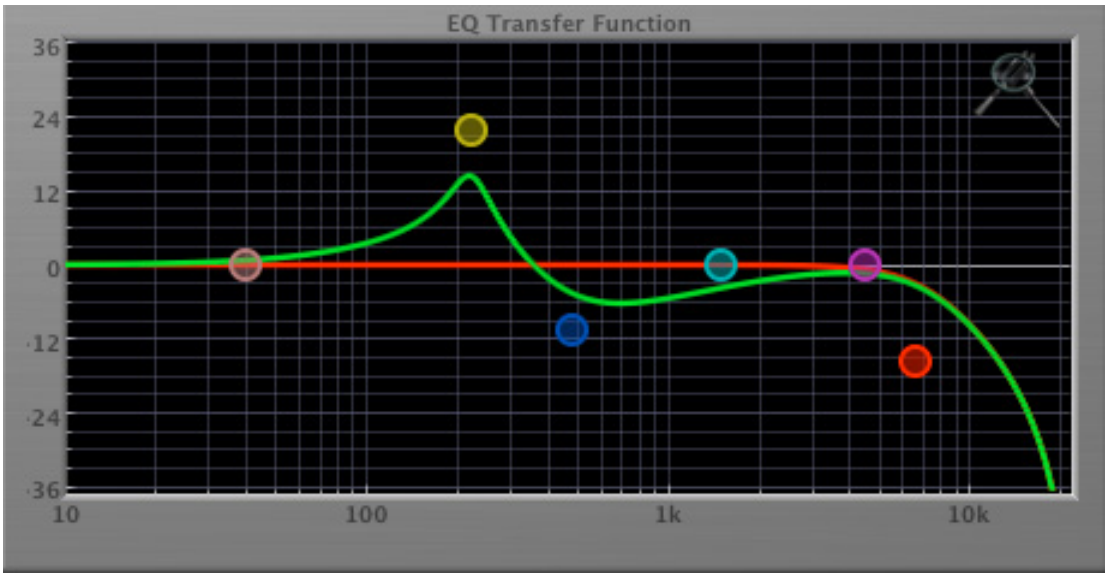

Figure 2.24: EQ Transfer Function

The following information applies to the EQ processing block as well as the sidechain filters of the gate and compressor.

The EQ transfer function is a combination of a visual representation of how the EQ is processing the signal and an intuitive controller for the associated filter bands. This display is sometimes called a “Cartesian Graph” by other EQ manufacturers.

The horizontal axis provides frequency calibration in Hertz (Hz). The vertical axis provides level calibration in decibels (dBr). The heavy green line indicates the relative change in level at each frequency that is created by the combined effects of all of the active bands in the equalizer. Each EQ band is represented by a colored dot in the transfer function. The color of the dot matches the color of the rings around the knobs for the corresponding EQ band.

The band that is currently being edited will be displayed along with the overall response curve. If the associated band is a parametric filter there will also be two smaller colored dots that can be used to control the bandwidth of the filter. Clicking on a large colored dot and dragging will allow you to adjust the frequency and gain of the associated band. ⌘–click the dot to toggle the band enable. ⌥ (Option)–click the dot to adjust the bandwidth (dragging right increases the bandwidth, left decreases the bandwidth). ⌘⌥ (Command + Option)–click the dot to switch the band filter type. Click and drag the smaller dots associated with a larger dot to adjust the filter bandwidth.

To dismiss the filter curve, click anywhere in the black area of the transfer function. This will deselect the filter point, and the only trace displayed will be the green master curve.

If you right-click or ^ (Control) click on the transfer function, you will see a menu to set the vertical dB scale for the display. The values are:

- ±3 dB
- ±6 dB
- ±12 dB
- ±24 dB
- ±36 dB

Spectragraph Analyzer

Clicking the SpectraFoo logo in the upper right hand corner of the transfer function will activate the spectragraph, showing the realtime frequency analysis of your signal:

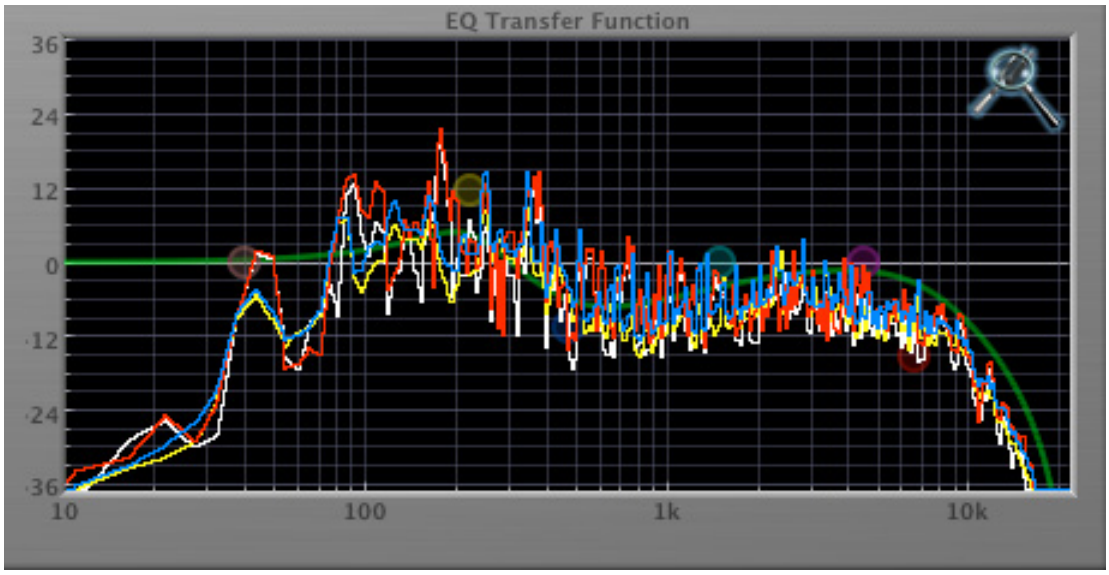

Figure 2.25: Spectragraph Display

The traces are:

- White: Left channel instantaneous display
- Red: Right channel instantaneous display
- Yellow: Left channel average display
- Blue: Right channel average display

The *instantaneous* trace updates in real-time, allowing you to see the immediate peak level of your audio. The *average* trace displays the level as averaged over a short period, giving you a more general view.

The spectragraph analyses the signal post-filter, allowing you to see the effect of your EQ filter(s); the EQ's spectragraph is also after the Master Gain and Limiter. The spectragraph may only be used in one window at a time and will toggle between sections. For example, if your are viewing the spectragraph in the EQ window and then click the the SpectraFoo icon in the compressor's sidechain window, the spectragraph will switch to that window. To disable the spectragraph entirely, click the active 'Foo icon.

If you right-click or ^ (Control) click on the transfer function, you will see a menu to set options for the spectragraph:

- Show Instantaneous Trace: Toggles whether the spectragraph shows the instant response of your audio.
- Show Average Trace: Toggles whether the spectragraph shows the averaged response of your audio.

- Show Left Channel: Toggles the left channel spectragraph display.
- Show Right Channel: Toggles the right channel spectragraph display.

These settings are stored for each transfer function window separately, and for each instance of ChannelStrip.

Dynamics Knee

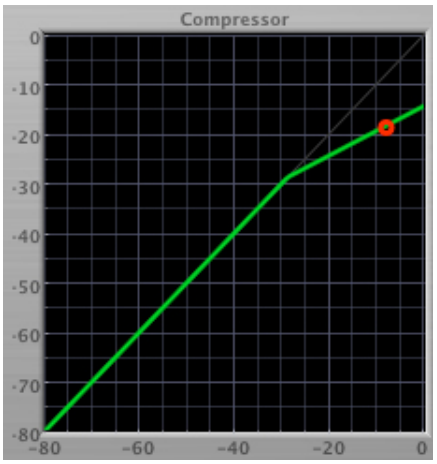

Figure 2.26: Dynamics Knee

ChannelStrip contains a Dynamics Knee diagram for the gate and compressor processing sections. The diagram provides feedback on the response of the associated dynamics processor. Both the horizontal and vertical axes are calibrated in dBFS. The horizontal axis corresponds to the input level and the vertical axis represents the output level. The heavy line shows the quiescent dynamical response of the associated processing block. This means that if you sent in a sine wave at a given input level, the output level would be equal to the level shown on the graph. When the processor is working with real dynamic signals, the graph is a good approximation of the response when the attack is fast and the release is slow.

In most cases, however, the dynamic response of the processor will not match its static response. In order to represent this, we have included a “bouncing ball” meter for both the gate and the compressor. This metering is shown as a red square that is overlaid on the knee diagram. The red square is placed so its horizontal position is equal to the instantaneous input level and its vertical level is equal to the instantaneous output level. Examining this meter while you are adjusting the dynamics controls will provide you with a great deal of information about how the processor is operating and how the controls interact.

Auto enables

The processing sections of ChannelStrip will automatically enable when one of it's parameters are adjusted. For example if the EQ master enable is off, adjusting any EQ parameter will turn it on. This way you will never make “phantom” adjustments where you make adjustments and hear no change. The same is true for the sidechain filters.

3. Processing

A Detailed Description

In this chapter we'll discuss what each processing block does and how the controls work.

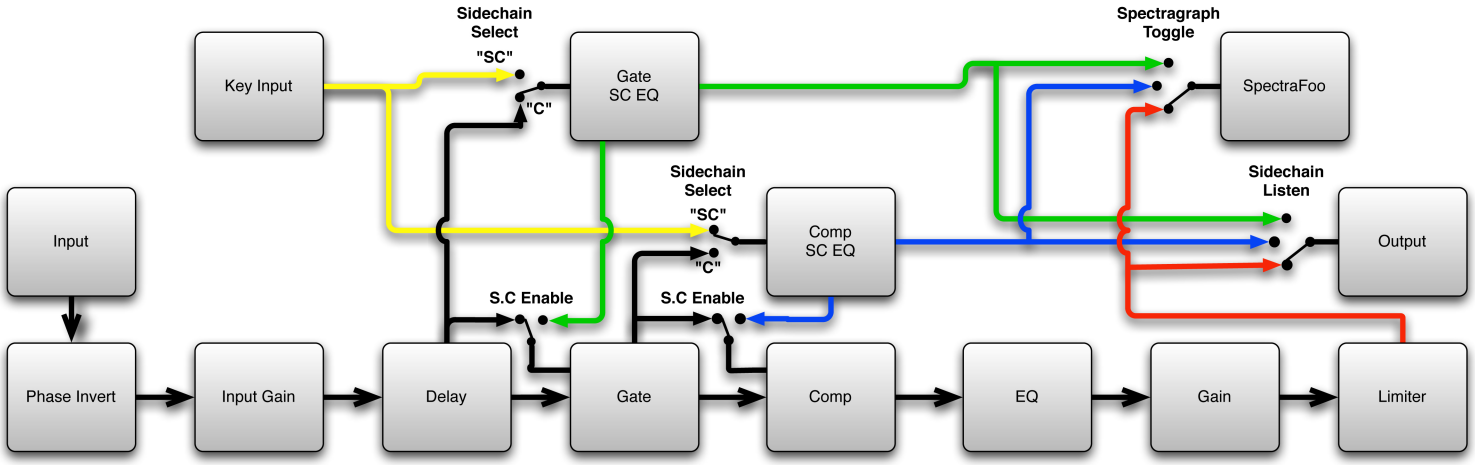

Figure 3.1: Signal Flow: Compressor is Pre-EQ

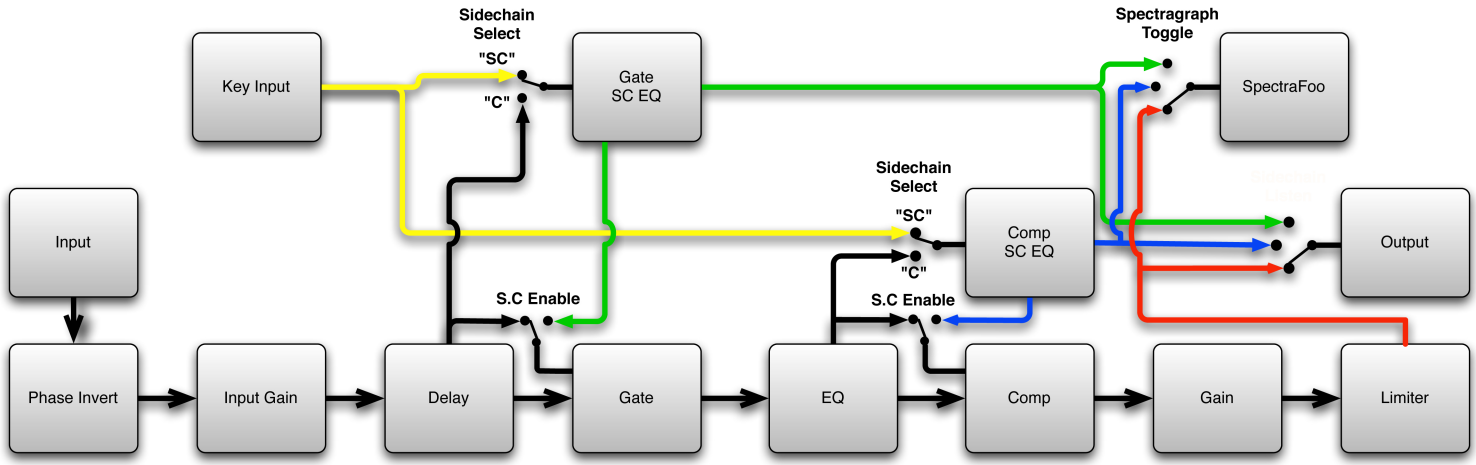

Figure 3.2: Signal Flow: Compressor is Post-EQ

The block diagrams above illustrate the overall structure of the processing system provided by ChannelStrip. The diagrams do not indicate the various metering blocks. The configuration is controlled by the “Post EQ” button in the compressor and it changes the path of the signal through the processor. The internal signal switching provided by ChannelStrip allows you to explore the various effects of re-ordering processing blocks without having to waste time stopping the transport, removing and reinserting plug-ins and then finally restarting the transport.

Now lets examine the various processing blocks indicated in the diagram.

Input Conditioning

After the signal is routed to ChannelStrip it runs through an input gain block that provides input gain of up to +24 dB. You can use this gain to condition signals that are low in level.

This input gain may also be used to pad out signals by up to –24 dB. While you may find this attenuation useful to just bring down the level through the strip simply and quickly, you must realize that this gain is applied after the signal reaches ChannelStrip and will not pad out any clipping that occurs in the A/D converters or in a plug-in that is inserted before ChannelStrip.

The input gain is controlled by the “In Gain” knob.

After the input gain/pad section, there is a phase invert block. This block is controlled by the “ø Inv” switch. When the phase invert is enabled the polarity of the signal will be flipped. The signal is cross-faded between the uninverted and inverted states so the signal level will drop briefly when you flip the state of the phase invert switch, but it will not introduce a glitch or click into your audio.

Gate/Expander

The next processing block is the Gate. The gate is used to adjust the low level dynamics of the signal being processed. Through the use of the external side-chain the gate can be used to do acoustic triggers. In addition, the side chain filter may be used to make the control of the dynamics frequency sensitive. This can be useful when you are trying to gate out a noisy signal that has a specific, very strong signal in a limited frequency range when you want the gate to open.

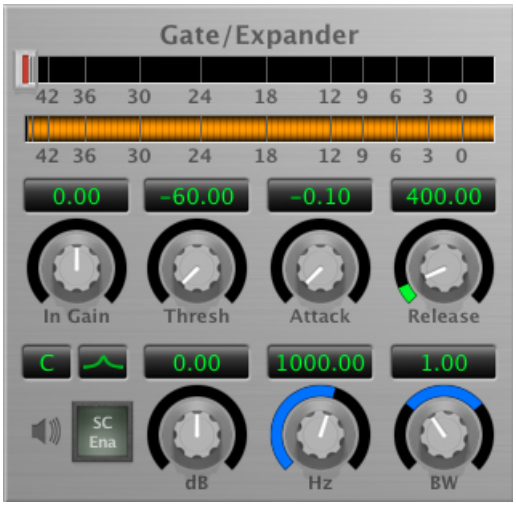

Figure 3.3: Gate/Expander

Theory Of Operation

Based upon your setting for the sidechain routing switch, either the Pro Tools sidechain input signal or the channel signal is fed to the sidechain filter. The sidechain filter provides one band of equalization that may be used to accentuate or cut certain frequencies (parametric or shelf filters) or limit the key to a certain range of frequencies (cut or bandpass filters). You control the filter type and the filter parameters with the filter type button and the “dB”, “Hz” and “BW” knobs.

You can enable the side chain filter with the green enable button.

After the sidechain signal has been processed by the sidechain filter it is measured by a level detector that determines the instantaneous level of the signal (in the case that ChannelStrip is running in stereo mode the detector is linked with the other channel in the stereo pair and the higher level of the two channels is used). The measurement made by the level detector is indicated by the orange triangle in the gate input meter.

When the gate is enabled the signal will be attenuated based on how much the detected level is below the threshold you set with the “Thresh” knob.

The dynamic behavior of the opening and closing of the gate is controlled with the “Attack” and “Release” knobs.

Gate Enable

This button is in the Master Enables section. When this button is off, the gate will not change the signal.

Threshold Control

The “Thresh” knob controls the level at which the gate opens and closes. When the detector level is above the threshold level the gain through the gate is 0 dB. When the detector level is below the threshold level, the gain is reduced at a ratio of 1:2. This means that if the detector is 3dB below the threshold the signal output will be 6dB below the threshold or 3dB below the input level.

The gate threshold level is also indicated by the red bar above the gate input meter. You can adjust the threshold level using this indicator as well as by using the “Thresh” knob.

Attack Control

The “Attack” knob allows you to adjust how quickly the gain reduction is decreased to 0 dB when the detector level goes above the threshold level. When this control is set to Auto, the attack rate is controlled by how much the detector level is above the threshold. When you set the attack to another value other than “Auto” that value, measured in milliseconds, will control how quickly the gate opens. The maximum value is 100 milliseconds. Attack times other than auto are especially useful when using the gate as a trigger. If the key signal is a little early you can use the attack to delay the trigger slightly. It is also useful to remove the initial transients of impulsive sounds.

Release Control

The “Release” knob controls the release time of the gate. This parameter is measured in milliseconds and can range from 5 ms to 5 sec. The release time controls how quickly the gate closes after the detector drops below the threshold value. For settings below 90 ms or so the gate closes pretty abruptly and may introduce unwanted artifacts into your audio, depending on the signal.

Using The Sidechain Key Input w/Selectable Filter

The gate provides a sidechain that processes audio before the detector determines the current level. The sidechain can process either the channel signal or some external side chain input signal. To engage the sidechain, click the “SC Ena” button.

Sidechain Listen Button

This button (the speaker icon next to the Sidechain Enable) allows you to monitor the audio being sent to the gate's detector. This will allow you to listen to external audio that is being routed to the sidechain, and also hear the effect of the sidechain filter. When you are done listening to the sidechain, click this button again to hear ChannelStrip's normal output.

Sidechain Routing Button

This button (labeled “C” in the illustration) is used to control the routing of the input signal to the gate sidechain. When the button is in the “C” state, the signal used by the sidechain is the signal being processed by ChannelStrip. When the button is in the “SC” state, the signal used by the sidechain is the input or bus selected in the “side chain input” popup in your DAW's plug-in window header. If nothing is selected in that popup, the input to the sidechain will be silence and the gate will never open.

Filter Type Button

This button (indicating a peaking/parametric filter in the illustration) is used to select the filter type of the single band of side chain EQ. You may choose from the 6 different types of filters detailed in the filter type section in “Operating the Strip”.

Filter Band Boost/Cut Control

Use this knob (labeled “dB” in the illustration) to adjust the gain of the filter band for the peaking, high and low shelf filter types. This parameter is ignored for the other filter types. In the shelving filters the maximum boost is +12 dB and the maximum cut is -24 dB. In the peaking filters the maximum boost/cut is ± 24 dB. When you increase the boost for a filter band above 15 dB, the filter gets nicely aggressive and resonant.

Filter Band Frequency

Use this knob (labeled “Hz” in the illustration) to adjust the characteristic frequency of the filter. For the peaking and bandpass filter types this controls the center frequency of the filter. For the high and low cut filter types this control adjusts the 3 dB point of the filter. For the shelving filters this control adjusts the shelf transition point.

Filter Bandwidth

Use this knob (labeled “BW” in the illustration) to adjust the characteristic width of the filter. This control only has effect for peaking, shelving and bandpass filter types. Please note that this parameter controls the bandwidth (measured in octaves), not the quality factor (or “Q”). If you have been using Q controls, the numbers will be backwards from what you are used to. Small numbers mean narrow filters and large numbers mean wide filters. For peaking and bandpass filter types, this parameter controls the bandwidth of the filter in octaves. For the high and low shelving filter types this parameter adjusts the amount of dip/peak and the slope of the shelf. When this parameter is set to 0.1 you will get the largest dip/slope available and when the parameter is 2.5, you will get a classic first order shelf (which has a transition band that is about 1 decade wide; e.g. if it is a high shelf with a frequency of 10 kHz and a gain of 10 dB, the gain will be at 0 dB near 1kHz).

Compressor

Depending on the state of the “Post EQ” button (the default state is for the compressor to come first in the signal chain), the next block in the signal processing chain is the compressor. The compressor is used to adjust the high–level dynamics of a signal. As with the gate, the sidechain can be used to make the compressor frequency sensitive (so it can be used like a de-esser) or to reduce the gain of the signal in response to some external event (this allows the compressor to be used like a ducker or for other creative effects).

Figure 3.4: Compressor

Often, you will want to compress the signal before you equalize it. Sometimes you will need to equalize the signal before you compress it. ChannelStrip provides that flexibility with the “Post EQ” button. This is a very

important part of ChannelStrip because it allows you to test different processing scenarios quickly and easily. It also allows you to compare the two different approaches without having to stop the transport so you can get a much more visceral comparison.

Theory Of Operation

The operation of the compressor is very similar to the gate. Based upon your setting for the sidechain routing switch, either the sidechain input signal or the channel signal is fed to the sidechain filter. The sidechain filter provides one band of equalization that may be used to accentuate or cut certain frequencies (parametric or shelf filters) or limit the key to a certain range of frequencies (cut or bandpass filters). You control the filter type and the filter parameters with the filter type button and the "dB", "Hz" and "BW" knobs.

You can enable the sidechain filter with the enable button. After the sidechain signal has been processed by the sidechain filter it is measured by a level detector that determines the instantaneous level of the signal (in the case that ChannelStrip is running in stereo mode the detector is linked with the other channel in the stereo pair and the higher level of the two channels is used). The measurement made by the level detector is indicated by the orange triangle in the compressor input meter.

When the compressor is enabled the signal will be attenuated based on how much the detected level is above the threshold you set with the "Thresh" knob and what compression ratio is set with the "Ratio" knob.

The dynamic behavior of the opening and closing of the gate is controlled with the "Attack" and "Release" knobs and the compressor character switch.

Audio Dynamics

Compressors are important in controlling the dynamic range of the source material you are working with. While the instruments, your ears, the microphones and your digital audio workstation all have dynamic ranges that are greater than 100 dB, most reproduction and delivery media have significantly reduced dynamic ranges. Compression is used, in its simplest form, to help reduce the dynamic range of your project or elements of the project to a range that is reproducible. It does this by making the soft material louder and the loud material softer. This type of processing can also be used to change the character of the sound instead of just adjusting the dynamic range. The compressor in ChannelStrip excels at both types of processing.

Compressor Enable

This button is in the Master Enables section. When this button is off, the compressor section will not change the signal. The order of this button will change depending on whether the compressor is set to "Post EQ".

Post EQ

The "Post EQ" button places the compressor section after the equalizer in the signal chain. By providing the capability to switch the routing on the fly, ChannelStrip allows you to determine the most effective routing for your particular signal quickly and easily.

Auto Gain

Enabling the "Auto Gain" button causes the compressor to automatically adjust the makeup gain in the compressor output stage so that if the manual "O Gain" knob is set to 0 dB the static gain reduction for a 0 dB input level will be about 7 dB. This number was chosen because it works well with the default settings of the "Attack" and "Release" knobs to provide enough pad to not clip fast transients. The "O Gain" knob will apply additional trim to the internal automatic gain. If the threshold is set very low (e.g. –60 dB) and auto gain is enabled, you will not be able to add very much manual gain (only about 1 – 2 dB) even though the readout on the knob will go up to + 30 dB. This is an internal limitation of the compressor.

Compressor Knee Control

The "Knee" knob allows you to adjust shape of the compressor transfer function when the Compressor Character is set to MIO (the Knee control has no effect for the other compressor character algorithms).

When the Knee control is set to 0, the transfer function of the compressor is a classic “hard-knee” in which the compressor applies no gain reduction when the detector is below the threshold, and the gain is reduced by the ratio when the detector level is above the threshold.

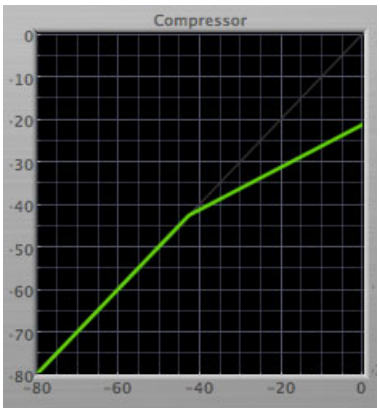

Figure 3.5: Knee control at 0

When you increase the Knee parameter from 0 to 1 the knee of the transfer function gradually softens until the compressor functions as a soft-knee compressor when the Knee parameter is 1.

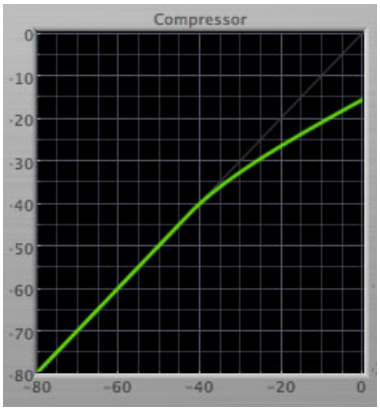

Figure 3.6: Knee control at 1

You can also adjust the Knee parameter to negative values, which has the effect introducing a “kink” in the compressor transfer function at the threshold. This can yield useful results on percussive material.

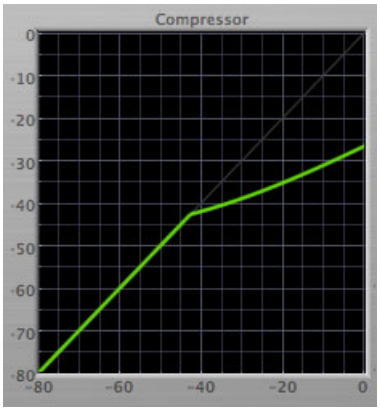

Figure 3.7: Knee control at -0.5

Manual Make-Up Gain

The “O Gain” knob allows you to manually adjust the makeup gain applied to the signal after the gain reduction applied by the compressor. If the Auto Gain switch is off, this is the amount of makeup gain applied. If the Auto Gain switch is on, then this parameter is a trim added to the internally computed makeup gain. The makeup gain is enabled and disabled along with the rest of the compressor.

Compressor Character

Use the compressor character button to determine the overall dynamic characteristics of the compressor. There are three “classic” ChannelStrip 2 settings to choose from:

- Smooth – appropriate for full mixes or single instruments that do not have big transients. Provides very smooth compression with few artifacts, no distortion and limited transient control.
- Warm – the most versatile setting for the compressor. Balances transient control with audibility of the compression. Appropriate for a wide range of signals including harmonic instruments with large transients (e.g. Plucked bass).
- Fast – provides significant transient control at the expense of transparency and added distortion. Appropriate for impulsive signals with significant transients. Supports very fast (e.g. 1 sample) gain reduction attacks.

as well as a new algorithm for ChannelStrip 3:

- MIO – provides the compressor characteristics from the MIOStrip compressor that runs on our interfaces. This compressor algorithm is very different from the other three. The MIO compressor generates its gain reduction directly from the detector level. The Attack and Release parameters directly control the measurement of the detector level. This allows the MIO compressor to function as a limiter as well as a compressor and a leveling amplifier. The MIO compressor algorithm also supports an adjustable Knee. In general, the MIO algorithm is more flexible and controllable than the other algorithms, and as a result, we have made it the factory default for ChannelStrip 3.

Threshold Control

The “Thresh” knob controls the level at which the compressor begins to reduce the gain applied to the signal. When the detector level is below the threshold level, no gain reduction is applied. As the detector level increases above the threshold level, the gain is reduced as indicated by the knee diagram associated with the compressor. The compressor knee is soft. The ratio increases as the difference between the detector level and the threshold increases.

The compressor threshold level is also indicated by the red bar above the gate input meter. You can adjust the threshold level using this indicator as well as by using the “Thresh” knob.

Ratio Control

The “Ratio” knob controls the ‘terminal’ ratio used to compute the gain reduction of the compressor. When the ratio associated with the soft knee hits the ratio specified by the ratio knob, the knee ‘hardens’ and remains at the same constant ratio. If you set the ratio to 1000:1 the compressor will have a soft knee for all input levels and thresholds. This makes the compressor work like a classic all tube limiter/compressor.

Attack Control

The “Attack” knob allows you to adjust how quickly the gain reduction is increases when the detector level goes above the threshold level. This control is calibrated in milliseconds and values range from 0 to 500 ms. The compressor has an 8 sample lookahead buffer that allows it to have an “instant attack” when you set the attack time to 0. Fast attack times will control the transients of impulsive sounds. Use longer attack times to let the transients through but control the sustains.

Release Control

The “Release” knob controls the release time of the compressor. This knob is calibrated in milliseconds and can range from 5 ms to 5 sec. The release time controls how quickly the gain reduction returns to zero after the detector drops below the threshold value. For settings below 40 ms or so the compressor releases pretty abruptly and may introduce unwanted artifacts into your audio, depending on the signal. In addition, be careful making the release time faster than the attack time.

Using The Sidechain Key Input w/Selectable Filter

The compressor provides a sidechain that processes audio before the detector determines the current level. The sidechain can process either the channel signal or some external side chain input signal. To engage the sidechain, click the “SC Ena” button.

Sidechain Listen Button

This button (the speaker icon next to the Sidechain Enable) allows you to monitor the audio being sent to the compressor's detector. This will allow you to listen to external audio that is being routed to the sidechain, and also hear the effect of the sidechain filter. When you are done listening to the sidechain, click this button again to hear ChannelStrip's normal output.

Sidechain Routing Button

This button (labeled “C” in the illustration) is used to control the routing of the input signal to the compressor sidechain. When the button is in the “C” state, the signal used by the sidechain is the signal being processed by ChannelStrip. When the compressor is in the “SC” state, the signal used by the sidechain is the input or bus selected in the “side chain input” popup in your DAW's plug-in window header. If nothing is selected in that popup, the input to the sidechain will be silence and the compressor will never compress.

You can use the filter to achieve a de-essing effect by using the bandpass filter to only compress when the “ess” is present. You can also achieve a combined compression/de-essing effect by using a peaking filter to accentuate the “ess” frequencies and adjusting the threshold and ratio to perform compression when the “ess” is not present and limiting when the “ess” is present. Take a look a the presets for examples.

Filter Type Button

This button (indicating a peaking/parametric filter in the illustration) is used to select the filter type of the single band of side chain EQ. You may choose from 6 different types of filters detailed in the filter type section in “Operating the Strip”.

Filter Band Boost/Cut Control

Use this knob (labeled “dB” in the illustration) to adjust the gain of the filter band for the peaking, high and low shelf filter types. This parameter is ignored for the other filter types. In the shelving filters the maximum boost is +12 dB and the maximum cut is -24 dB. In the peaking filters the maximum boost/cut is ± 24 dB. When you increase the boost for a filter band above 15 dB, the filter gets very aggressive and resonant.

Filter Band Frequency

Use this knob (labeled “Hz” in the illustration) to adjust the characteristic frequency of the filter. For the peaking and bandpass filter types this controls the center frequency of the filter. For the high and low cut filter types this control adjusts the 3 dB point of the filter. For the shelving filters this control adjusts the shelf transition point.

Filter Bandwidth

Use this knob (labeled “BW” in the illustration) to adjust the characteristic width of the filter. This control only has effect for peaking, shelving and bandpass filter types. Please note that this parameter controls the bandwidth (measured in octaves), not the quality factor (or “Q”). If you have been using Q controls, the numbers will be backwards from what you are used to. Small numbers mean narrow filters and large numbers mean wide

filters. For peaking and bandpass filter types, this parameter controls the bandwidth of the filter in octaves. For the high and low shelving filter types this parameter adjusts the amount of dip/peak and the slope of the shelf. When this parameter is set to 0.1 you will get the largest dip/slope available and when the parameter is 2.5, you will get a classic first order shelf (which has a transition band that is about 1 decade wide; e.g. if it is a high shelf with a frequency of 10 kHz and a gain of 10 dB, the gain will be at 0 dB near 1kHz).

Equalizer

The next processing section is the Equalizer. The equalizer may appear in the signal chain before the compressor section depending on the state of the "Post EQ' button in the compressor. The equalizer in ChannelStrip is a very flexible, fully parametric 6 band equalizer. Each band in the equalizer can be configured as any of the six available filter types. Each parameter in the equalizer is continuously adjustable throughout its entire range, so you can set the exact EQ that you need.

Figure 3.8: EQ Section

Theory Of Operation

The equalizer in ChannelStrip work just like every other EQ under the sun with the exceptions that is more flexible, more efficient and sounds better. By adjusting the various parameters associated with each band in the EQ you can control the tonal and timbral balance of the signal. The resonance effect of the peaking filters provides a facility to recreate acoustic resonances that are lacking in the source material with which you are working. One of the nicest aspects of the filters in ChannelStrip is their time domain performance. These filters ring significantly less than comparable filters in other signal processors. This allows you equalize signals without the normal time smearing that you encounter with other equalizers.

Master Enable Button

This button is in the Master Enables section. When this button is off, the EQ section will not change the signal. The order of this button will change depending on whether the compressor is set to "Post EQ".

Filter Type Button

This button (indicating a peaking/parametric filter in the illustration) is used to select the filter type of the single band of side chain EQ. You may choose from 6 different types of filters:

Figure 3.9: Peaking/Parametric

Peaking/Parametric – a second order bell-shaped parametric boost/cut filter. Boost/cut has a range of ± 24 dB. When the boost is greater than +15 dB the filter gains a resonant quality. The center frequency of the filter can be any frequency between 20 Hz and 20 kHz. The bandwidth of the filter is continuously variable between 0.1 octaves and 2.5 octaves.

Figure 3.10: Low Cut

Low Cut – a 12 dB/octave low cut filter with a -3dB point that is continuously adjustable between 20 Hz and 20 kHz.

Figure 3.11: High Cut

High Cut – a 12 dB/octave high cut filter with a -3dB point that is continuously adjustable between 20 Hz and 20 kHz.

Figure 3.12: Low Shelf

Low Shelf – a shelving filter that applies boost/cut to low frequencies. Boost/cut is limited to +12 dB/– 24dB. The bandwidth controls the dip/peak that is added at the end of the transition band.

Figure 3.13: High Shelf

High Shelf – a shelving filter that applies boost/cut to high frequencies. Boost/cut is limited to +12 dB/– 24dB. The bandwidth controls the dip/peak that is added at the end of the transition band.

Figure 3.14: Bandpass

Bandpass – a bandpass filter with 6dB per octave skirt on the high and low ends of the pass band. The width of the pass band can be adjusted between 0.1 octaves and 2.5 octaves and the center of the pass band is continuously adjustable between 20 Hz and 20 kHz.

Filter Enable Button

Use this toggle button to enable each filter band. When the filter band is turned off the signal will pass through the filter unchanged.

Filter Band Boost/Cut Control

Use this knob (labeled "dB" in the illustration) to adjust the gain of the filter band for the peaking, high and low shelf filter types. This parameter is ignored for the other filter types. In the shelving filters the maximum boost is +12 dB and the maximum cut is -24 dB. In the peaking filters the maximum boost/cut is ± 24 dB. When you increase the boost for a filter band above 15 dB, the filter gets very aggressive and resonant. You can use this feature to good effect when you need to reconstruct a resonance for a recorded instrument that lacks one. For example, you could place a narrow +24 dB peaking filter between 60 and 80 Hz on a kick drum track that lacked a "belly" for the drum.

Filter Band Frequency

Use this knob (labeled "Hz" in the illustration) to adjust the characteristic frequency of the filter. For the peaking and bandpass filter types this controls the center frequency of the filter. For the high and low cut filter types this control adjusts the 3 dB point of the filter. For the shelving filters this control adjusts the shelf transition point.

Filter Bandwidth

Use this knob (labeled "BW" in the illustration) to adjust the characteristic width of the filter. This control only has effect for peaking, shelving and bandpass filter types. Please note that this parameter controls the bandwidth (measured in octaves), not the quality factor (or "Q"). If you have been using Q controls, the numbers will be backwards from what you are used to. Small numbers mean narrow filters and large numbers mean wide filters. For peaking and bandpass filter types, this parameter controls the bandwidth of the filter in octaves. For the high and low shelving filter types this parameter adjusts the amount of dip/peak and the slope of the shelf. When this parameter is set to 0.1 you will get the largest dip/slope available and when the parameter is 2.5, you will get a classic first order shelf (which has a transition band that is about 1 decade wide; e.g. if it is a high shelf with a frequency of 10 kHz and a gain of 10 dB, the gain will be at 0 dB near 1kHz).

Controlling The EQ With The Transfer Function

As described in the operation guide earlier in this manual, you can control each band of the EQ directly from the EQ transfer function display associated with the 6 band equalizer.

Master Gain

The one fader in ChannelStrip's user interface controls the master gain of the plug-in. This fader is not shown in the illustration of the EQ section, but it is shown in the overall processor illustration at the beginning of this manual. The "Master Gain" fader allows you to add up to +10 dB of gain or up to -160 dB of attenuation to the output signal from the EQ processor or compressor block (depending on the processor order) before going to the limiter.

Delay Section

You can add up to 255 samples of delay to the output of ChannelStrip. This is useful for dynamically slipping tracks, doing acoustical time alignment or compensating for the delay of other plug-ins in your mix.

You can use automation on the delay to create interesting dynamic flanging effects. Simply duplicate a track and enable automation on the delay control for one of the copies. As you change the delay through one of the copies you will create a nice, controllable phasey flanging sound.

Limiter

Figure 3.15: Limiter

The final processing block in the ChannelStrip is a limiter. The limiter can be used to ensure that the final output of ChannelStrip doesn't distort due to extreme EQ boosts. This also makes it very easy to use ChannelStrip as a mastering plug-in on your final mix bus.

The limiter threshold may be set between 0 and -12 dB using the Limiter Threshold knob.

The gain reduction is displayed via the ring around the encoder, sweeping from right to left.

4. Working with Hosts

Pro Tools™

Your Pro Tools software provides a standard interface for controlling various aspects of AAX plug-ins. While you should refer to your Pro Tools documentation for a complete description, we will summarize the most important points here.

Since you will want to use ChannelStrip on every channel in your mix, you should ⌥ (Option) insert ChannelStrip on all of your main mono mix channels and ensure that ChannelStrip is inserted on the same insert point on every channel (e.g. ensure that ChannelStrip is on insert a for every channel). This will allow you to take advantage of a number of time saving features provided by Pro Tools.

Plug-in Window

The illustration below shows the standard Pro Tools plug-in window.

Figure 4.1: Pro Tools Plug-in Window

If you have inserted ChannelStrip as we suggested above you can click on the channel name popup in the upper left hand corner of the window (labeled "Audio 1" above) to switch from channel to channel.

The next popup in the window (labeled "b" above) allows you to switch to another insert on the same channel. You would use this to switch to another plug-in on the same channel.

The bypass button allows you to bypass the effects of ChannelStrip. When the bypass is turned on all of the processing sections, including the user-configured delay, of ChannelStrip are bypassed.

The Pro Tools editor/librarian button (the small downward pointing triangle) provides access to a popup menu that allow you to manage presets and libraries of setting for ChannelStrip. Use this menu to save libraries or open groups of libraries. See your Pro Tools documentation for more information.

The preset library popup menu (labeled "factory default" above) shows the active preset name (in italics if the current settings do not match the library). Click this popup to select from the available presets.

The "Compare" button indicates when the controls have changed for the current preset settings. Click this button to toggle between your current settings and the preset settings.

Figure 4.2: Compare Button

Clicking the "Automation" button causes Pro Tools to display the plug-in automation configuration dialog box:

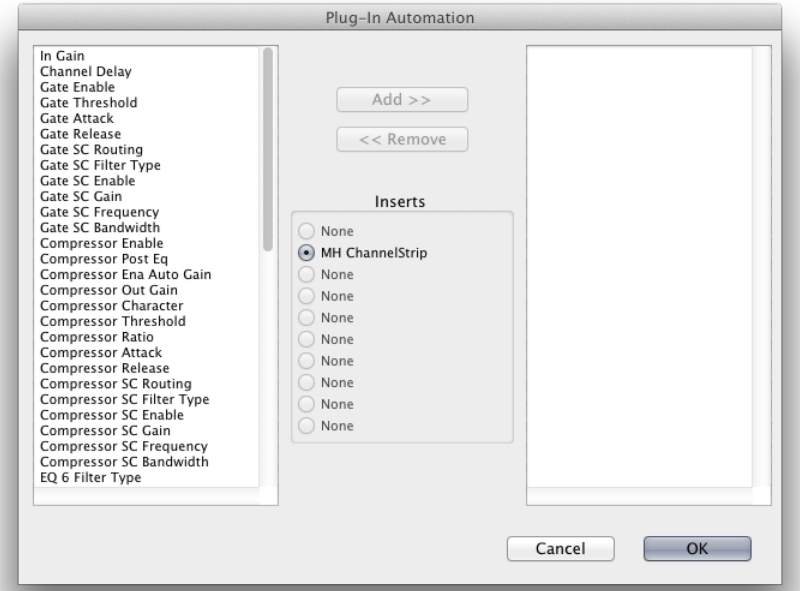

Figure 4.3: Automation Window

This dialog box allows you to enable any or all of the processing parameters for automation. When a parameter is enabled for automation you will be able to record and play-back automated parameter changes directly from your Pro Tools session. If the channel that ChannelStrip is inserted on has automation enabled ChannelStrip will highlight the controls associated with the automated parameters:

- Off: No color
- Read: Green
- Touch, Latch, Write: Red
- Controlled via control surface: Blue

Key Input

The key input popup menu allows you to select from any mono input or bus in your system and feed it to the internal sidechain bus within ChannelStrip. You then use the sidechain routing buttons to assign the sidechain bus to the gate and compressor detectors.

KEY COMMANDS

Pro Tools provides two standard key commands for use with plug-in automation. ^⌥⌘ (Control + Option + Command)–click a control to pop up a menu that allows you to enable/disable automation of the associated parameter, or to bring up the automation dialog. ^⌘ (Control + Command)–click a control to cause Pro Tools show that control's automation breakpoint graph in the Pro Tools edit window.

5. Conclusion

After working with ChannelStrip we hope you will agree that it meets or exceeds the goals that we described in the introduction of this manual. We think that you will find the flexibility, sonic quality and efficiency of ChannelStrip hard to beat. While we know that there are other processors that you will use to get a specific “sound” or to accomplish processing not provided by ChannelStrip we think that you’ll find yourself using ChannelStrip on every track.

6. Service and Support

Metric Halo takes great pride in the reputation for customer service and support that we have built. If you have any problems, questions, or suggestions please get in touch with us at:

- http://mhsecure.com/support
- support@mhsecure.com
- (727) 725-9555

Please keep us informed about your successes and projects. We love to hear from you!