

FIRIUM Version 1.0

User's Guide

VST Plug-In

**Macintosh/
Windows**

Elemental Audio Systems

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Welcome to Firium

Congratulations! You have purchased the VST® version of **Firium**. This version of **Firium** is compatible with any software application running on your Macintosh system that supports the VST plug-in format. Since **Firium** is a plug-in, you gain access to its functionality via your favorite audio processing or editing software. Once properly installed, **Firium** will appear under the appropriate menu item, often labeled **Effects** or **Plug-Ins**, in your chosen software application.

Firium is a stereo finite impulse response, or FIR, mastering equalizer. By simply drawing a curve or moving one of fifty control points (*balls*), you construct your filter's response **and** see its effect on your audio in real time. Even while editing your filter, you get an accurate picture of how the EQ affects your audio. **Firium** gives you sophisticated EQ to your exact specifications without non-linear phase shift or smearing - a completely transparent EQ that does exactly what you tell it. You can't get this functionality with conventional equalizers.

There are a multitude of curve editing features built into **Firium** that allow you to construct complex filters with ease. In addition to moving or nudging one of the fifty control points, you may draw your curve freehand. Independent left/right channel editing, control coupling, channel link modes, curve scaling, smoothing, and an extensive history are just some of the features that make designing your perfect filter a breeze.

Two workspaces allow you to create and compare changes to your EQ. The customizable spectral display gives you the freedom to view only the information of interest to you. Only interested in the left channel? Want the controls to disappear? Go on. With a few clicks, **Firium** gives you the ability to see just the information you need: left channel, right channel, input, output, or a combination - with, or without balls. And remember, **Firium's** usefulness is not limited to mastering. You can use **Firium** whenever you need a transparent and highly flexible equalizer.

Enjoy!

How Firium Works

Firium uses finite impulse response filters (also known as FIR, linear-phase, or non-recursive filters) to achieve its transparent sound. Conventional equalizers use infinite impulse response (IIR) filters that introduce phase distortion into the filtered signal. FIR filters do not exhibit this effect. Check out the following figures that illustrate this point. An input signal (Figure 1) was first filtered using an IIR filter. The IIR filtering result is shown in Figure 2. Figure 3 shows the result when the same signal is filtered with an FIR filter. While it is debated how audible this difference is, it is obvious from the pictures below that an FIR filter does a much better job of preserving the shape of the original signal than a traditional IIR filter. FIR filters do only what you want – boost or cut the specified frequencies without coloring your audio. There is a tradeoff to using FIR filters - they require more processing power than IIR filters. However, this is not as much of an issue these days with the increasing power of desktop computers.

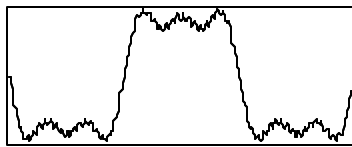


Figure 1 Input signal



Figure 2 Conventional EQ (IIR)

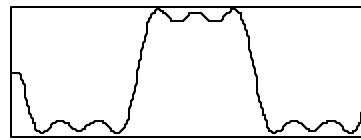


Figure 3 Firium EQ (FIR)

About This Guide

This User's Guide is designed to get you up and running quickly with your software - providing all you need to know about how to use your plug-in. The first section, **New Beginnings**, is designed to quickly get you using Firium to create an EQ. The second section, **Navigating Around Firium**, gives you a thorough tour of the Firium interface. Here you will become familiar with all of the tools that make up Firium and the functionality each tool provides. The sections that follow give you the detail you need to realize the full potential of Firium. While Firium is designed to be very intuitive to use, we suggest you read this entire guide to ensure you are utilizing Firium to its fullest.

This guide is written for both Macintosh and Windows versions of Firium. Where a difference in functionality exists between the two operating systems, the following notation applies: MAC [WIN]. That is, the Windows specific command or function is placed in brackets and follows the Macintosh specific command. For example, if you gain access to certain functionality by pressing the Command (CMD) key on the Macintosh and the Control (CTRL) key on Windows, this would be written as CMD [CTRL]. A list of all modifier keys used appears near the end of this guide.

Note: Look in boxes like this one for cautions, tips or other information you should be sure to take note of.

Gray alert boxes, like the one shown above, appear throughout the text of this manual. These boxes bring special concerns or tips to your attention. The title of the alert box indicates its intent. You may see alert boxes with the following titles:

- Caution:** Warns of potential damage to your hardware, software, audio, or ears
- Note:** Important notes or considerations regarding the functionality of Firium
- Tip:** Ideas or suggestions for using Firium

Installation

System Requirements

Macintosh

PowerPC G3 or above
(G4 recommended for OS X use)
MacOS 9.x or MacOS X
VST compatible host application

Windows

Pentium III or similar processor
Windows 98/ME, 2000, or XP
VST compatible host application

Installing Firium

Installing Firium is quick and painless.

1. Decompress your downloaded file using the appropriate utility. Double click on the Firium.img file and a mounted disk will appear. Double click the mounted disk.
2. You need to copy the Firium application to your desired VST Plug-Ins folder. To avoid confusion, we recommend deleting or removing the Firium demo from this folder.
3. **Mac only:** Your download includes both the OS 9 and OS X versions of Firium. The OS 9 version, indicated by a '9' in the file name, can only be used in OS 9. OS X compatible hosts can use the OS X version, indicated by the 'X' in the file name. Hosts that have been "Carbonized" and can run in both OS 9 *and* X need only have access to the OS X version of Firium. Placing the OS X version of Firium in the VST-Plug-ins folder of such a host will enable you to access Firium when using that host in OS X *or* OS 9.
4. User's Guides: To install the PDF User's Guide, drag it to the desired location on your computer. To install the HTML User's Guide, drag the entire Firium Guide (html) folder to your desired location.
5. Launch your VST compatible host application and use Firium (if this step is unclear to you, please consult your hosts documentation for specifics).
Note: Some hosts must be specifically instructed to re-scan the plug-in directory before the listing of available plug-ins is updated to reflect newly installed plugs. Consult your hosts' documentation if Firium does not appear in the appropriate plug-in list.
6. You're done!

Uninstalling Firium

Uninstalling Firium is simple - just remove the Firium application from the VST Plug-Ins folder you previously installed it to. Note: Some host applications must be specifically instructed to rescan the VST Plug-Ins directory before the listing of available plug-ins is updated to reflect uninstalled plugs.

Setup

Ensure Firium is properly installed into the appropriate VST Plug-ins folder for your favorite VST compatible audio processing application (“host application” or “host”). Launch your chosen host application and open an audio file. Start Firium by accessing it through the appropriate menu item – check **Effects** or **Plug-Ins** or the documentation for your host application. See **Installation** earlier in this guide if you have not completed the installation procedure or if you have trouble accessing your plug-in.

Quick Start

This section walks you through creating your first EQ. Boxes with a gray outline appear throughout this section. These boxes give instructions for testing out different aspects of Firium’s functionality. After reading this section, you will have been exposed to most of the features you will use to create EQs with Firium. However, it is still recommended that you read this entire guide to ensure you are using Firium to its fullest. For greater detail on any portion of Firium’s functionality, please consult the appropriate area found later in this guide. Now launch Firium as specified in Setup, above, and follow along.

Three steps to an EQ

1. Check Out the Spectral Display

The spectral display occupies the center of the Firium interface. Most of your work in creating an EQ will be accomplished here. The spectral display contains a wealth of information, most notably the filter response curve. The filter response curve is an interactive graphical representation of the EQ you have created. Fifty control points appear along this curve. Also see **Navigating Around Firium: Spectral Display**.

2. Select A Channel To Edit

When Firium is first opened, by default, the left channel is selected and both channels are “locked” together so changes you make to one channel apply to both channels. Select a channel for editing using the large **L** (left channel) and **R** (right channel) buttons located to the bottom, left of the Firium display. The left channel is selected by default. The other buttons located in the **CHANNEL EDIT AND LINKING** area are used to choose how changes to one channel will affect the other channel. Also see **Navigating Around Firium: Channel Edit and Linking**.

Press the **L** and **R** buttons and note how the spectral display changes to reflect the channel you are editing.

3. Create an EQ

There are two primary ways to create your EQ with Firium. You may move each control point individually, choosing how much neighboring controls are affected, or simply draw your filter response freehand. Freehand drawing is available whenever in the spectral display and not directly over a control point.

When the cursor is passed over a control point, a circle surrounds the control indicating you are in coupling mode. You may edit a control in this mode by clicking on it and dragging it vertically (up and down) to set the amount of gain for the given control. When dragged vertically, the selected and neighboring control points move according to the type and level of coupling you have selected with the coupling display. The coupling display is located to the left of the spectral display. Also see **Navigating Around Firium: Coupling**.

Drag a control point up and down and note how neighboring controls are affected. Next, try drawing in the spectral display freehand.

Advanced Editing and Features

EQ Editing Magic

More sophisticated movement and curve editing can be achieved using dynamic coupling. Dynamic coupling enables you to make “on-the-fly” changes to your EQ curve. You enable dynamic coupling by holding down OPTION [CTRL] while clicking on the graphic in the coupling display – **DYN** will be displayed. When in this mode, in addition to dragging up and down, you can drag horizontally, toward or away from the active control point, to easily adjust the shape and extent of your filter curve. Horizontal movement away from the selected control point will increase the effect the selected control has on other controls. Horizontal movement toward the control will decrease the effect. As usual, vertical movement will determine the gain for the selected and affected control points. Even while using dynamic coupling, Firium allows you to see and hear the effects of your changes in real-time. Also see **Navigating Around Firium: Coupling**.

Zero your EQ curve by pressing the **ZERO** button located below the coupling display. OPTION [CTRL] + click on the coupling display to enable dynamic coupling. Drag a control up (or down) and move the mouse left and right. Note how your curve changes dynamically.

Tweaking A Drawn EQ Curve

Use the **SMOOTH** slider to smooth out a curve you have drawn freehand. Hold down the OPTION [CTRL] key while using the **SMOOTH** slider to only smooth your last edit. Use the **CURVE SCALE** slider to expand or compress the gain of your EQ. The **INV** button inverts your curve. Also see **Navigating Around Firium: Smooth** and **Navigating Around Firium: Curve Scale**.

Like the shape of your EQ curve but wish you could shift it up or down, left or right? You can. Depressing the SHIFT [SHIFT] key allows you to click and drag your filter curve up and down. Use CMD [CTRL+SHIFT] to shift your curve to the right or left.

Draw a curve freehand in the spectral display. Move the knob of the **SMOOTH** and **CURVE SCALE** sliders and note the effect on your filter response curve. Use the key combinations mentioned previously to boost/cut your entire EQ curve and shift your curve right or left.

Viewing Prior Edits

Drag the **HISTORY** slider to the left to see prior edits. A read-out to the left of the history slider indicates the history level currently being viewed. Use the arrow buttons found around the history display, to flip through prior edits, one at a time. Also see **Navigating Around Firium: History**.

After making several edits, slide the **HISTORY** slider knob back and forth to view, and hear, changes you have made to your EQ.

Boosting the Output

Use the output gain fader to boost or cut the output. The current value is displayed at the top right corner of the spectral display. Also see **Navigating Around Firium: Output Trim and Meters**.

Workspaces

There are two workspaces available in Firium so you can easily compare different EQs. When Firium starts you are, by default, using workspace **A**. Use the **A** and **B** buttons to switch between workspaces. Copy your current EQ to the other, inactive, workspace using the **CPY** button. Use **CLR** to clear your workspace. Clearing your workspace zeros the EQ curve and resets the gain fader. Also see **Navigating Around Firium: Workspaces**

Customizing the Spectral Display

Use the controls located in the **SHOW** section at the bottom of Firium's interface to customize the spectral display. Also see **Navigating Around Firium: Show**.

Loading Settings

Use the integrated **LOAD** and **SAVE** to save an EQ to a file and easily load it again in any host. Also see **Navigating Around Firium: Load and Save**.

Navigating Around Firium

This section gets you familiar with the Firium interface, providing an in-depth look at the functionality each area provides.



Spectral Display ①

The spectral display, located in the center of the window, occupies the bulk of the Firium interface. In addition to the filter response curve, the display may show the input and output spectrums for the left and/or right channel. The left channel's spectrums are shades of blue; the right channel's spectrums are shades of red. For clarity, the output spectrums are lighter and brighter than the input spectrums.

Fifty control points, each capable of ± 18 dB of gain, appear along the filter's response curve for editing. When the channels are being edited separately, and a different EQ is being applied to each channel, controls only appear along the currently selected channel's filter curve. It is easy to control

whether the control points are visible and which spectra are displayed (see **Navigating Around Firium: Show**).

Cursor Readout

When you move the cursor in the filter graph area, the frequency and gain corresponding to the cursor's position appear at the top, middle of the spectral display. This cursor readout area can be used to precisely place controls when dragging them into position.

Scale

Firium displays frequency logarithmically and gain linearly. The scale along the left side of the spectral display indicates the gain, or amplitude, in decibels (dB), of your curve. To the right side of the spectral display you will find labels indicating the relative amplitude of the signal. The frequency, measured in hertz (Hz), is shown along the bottom of the filter graph. The frequency range displayed may vary, depending on the sampling rate of your audio (see **Details, details: Supported Sampling Rates** for more information on this).

Channel & Delay Readout

Text located on the top, left side of the display indicates the channel and/or the type of channel linking you have selected. Directly below, the exact amount of delay that has been introduced into your audio is indicated. Depending on your host application and how you are using Firium, you may need to adjust for this delay (see **Details, details: No, don't say It** for more on delay).

Output Trim Display

Text located on the top, right side of the spectral display indicates the current level of the output gain fader (see **Navigating Around Firium: Meters and Output Trim**).

Workspaces ②



A and **B**. Directly to the top left of the spectral display are controls for two workspaces, **A** and **B**. Each workspace provides an area for you to develop an EQ. By utilizing both workspaces, you can construct two separate EQ curves while maintaining your history of edits for each one. By switching between workspaces, you may easily compare and contrast the different EQ curves you have created. To choose a workspace or switch between workspaces, simply click the button of the workspace you would like to make active. Workspace **A** is active by default.

CPY. You can copy your current filter curve to the inactive workspace by clicking the **CPY** button located underneath the **B** button.

CLR. Clear a workspace by pressing the **CLR** button located above the **A** button. Clearing a workspace zeros the filter response curves for both channels and resets the output gain fader to zero. The history is not cleared when you clear a workspace.

Coupling ③



The coupling control is located below the workspace controls. Coupling is analogous to the bandwidth, or “Q”, control found on a mixing board - it allows you to specify how closely, and in what manner, surrounding control points will follow the control point being edited. Coupling provides a very flexible and intuitive way to construct and modify your filter curve.

Note: Your coupling settings are only applied when a control point is dragged in the spectral display.

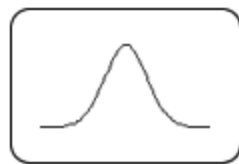
Coupling is enabled when the cursor is placed over a control. A white or green circle appears around the selected control to indicate which of Firium's two coupling modes is active. A white circle indicates that “regular” coupling is active. A green circle indicates that Dynamic Coupling is active (see **Dynamic**

Coupling later in this section). When a white circle surrounds a control, dragging it up and down will construct a curve similar to the one shown in the coupling display. If Dynamic Linking is active, you may drag vertically and horizontally to dynamically adjust the gain and width of your curve.

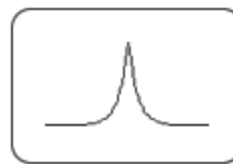
Coupling is primarily controlled by means of an innovative coupling display and two arrow buttons. The coupling display provides a visual representation of the way neighboring control points are linked. The arrow buttons are located below the coupling display and are used to view and select different levels of coupling. The coupling settings you have selected using the coupling display only apply *when an individual control point is dragged in the spectral display*.

Coupling Types

Two types of coupling are available. **GAUSS** coupling moves neighboring controls with a relationship like that found among points along a *Gaussian* curve. Selecting **GEOM** coupling causes neighboring controls to be moved with a relationship similar to that found between points on a *geometric* curve (see illustration that follows). Click on **GAUSS** or **GEOM** to toggle between these two types. **GAUSS** is selected by default.



Gaussian Curve



Geometric Curve

Both coupling types have four levels, numbered one (1) through four (4), from which you may choose. The number corresponding to the level of coupling you have selected appears in the coupling display. Increasing the level increases the influence the selected point has on surrounding points. These settings allow the construction of a natural curve as neighboring control points follow the point being edited. The arrow buttons located directly below the coupling display allow you to quickly move between levels. The graphical representation in the coupling display changes to reflect the current coupling level in addition to the current coupling type. This gives you a picture, at a glance, of the type of coupling that is active. Play around with the coupling types and levels to get a real feel for the functionality coupling provides.

Dynamic Coupling

In addition to using the coupling display to change the level of coupling, you may change your coupling level dynamically. When dynamic coupling is active, you choose and change the level of coupling while editing your curve in the spectral display. The shape of your curve is still determined by the type of coupling, Gaussian or geometric, that is active. To have dynamic coupling apply whenever dragging a control in the spectral display, hold down **OPTION [CTRL]** while clicking on the curve graphic in the coupling display – **DYN** is displayed. Alternatively, use the arrows to cycle through the available coupling types until **DYN** is displayed. You may use dynamic coupling at any time by holding down **OPTION [CTRL]** and dragging a control.

Tip: You can use dynamic coupling at any time by holding down **OPTION [CTRL]** and dragging a control point in the spectral display.

As usual, dragging a control up and down will determine its gain. However, dragging horizontally, to the left or right, allows you to easily adjust the shape and extent of your filter curve, changing the coupling at will. Horizontal movement away from the selected control point will increase the effect the selected control has on other controls. Horizontal movement toward the control will decrease the effect.

Dynamic coupling offers a much greater range of levels than are accessible through the coupling display. This method of editing allows fine adjustments in the way controls are coupled and enables you to hear these variations in real time. Click on the curve graphic to disable dynamic coupling and enable your previous coupling selection.

Disabling Coupling

Use the arrows to move the coupling display to **OFF** to turn coupling off completely. With coupling disabled in this manner, you may drag each control without having it affect any other controls.

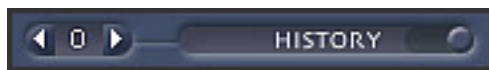
Zero and Invert



Below the coupling display are the zero (**ZERO**) and invert (**INV**) controls. Use **ZERO** to flatten, or reset, the currently selected channel's filter curve. **INV** inverts the current channel's curve. If Channel Linking is active, e.g. **STRONG**, **WEAK**, or **LOCK**, pressing **INV** or **ZERO** will affect both channels.

Caution: Consider your filter and audio carefully before using the **INV** function. Areas that were attenuated will now be boosted. If used carelessly, this could potentially cause damage to your hearing or equipment.

History 4



Firium offers you an extremely intuitive **HISTORY** control to view the modifications you have made to your EQ. Use the slider to get an overall view of your progress or to quickly locate a particular change. Alternatively, use the left and right controls to step through your changes one by one. Firium tracks 100 levels of history giving you the freedom to try out changes at will. The **HISTORY** control can be found directly below and to the left side of the spectral display.

Note: If you scroll back through the history and edit from an older filter state, you will lose more recent edits.

Using the History Slider. Don't think of using the **HISTORY** slider only when you need to undo a change you've made. The design of the **HISTORY** slider makes it a useful tool anytime you are developing an EQ. When tweaking your EQ, it is very helpful to be able to easily scroll back, see, and listen to the changes you have made to get a good sense of where you are going. Essentially, this

allows you to quickly and easily hear the effect of many different EQs on your audio. Of course, if you realize you've been going down the wrong path, it's nice to be able to go back to a prior state.

Tip: Don't think of the **HISTORY** slider only in terms of undoing a mistake.

Curve Scale ⑤



That's right, you guessed it, **CURVE SCALE** allows you to scale your filter curve. This handy feature allows you to scale (compress or expand) your entire EQ curve by 50-200% to vary the intensity of its effect. The **CURVE SCALE** knob snaps back to the center point when the mouse button is released so scaling may be applied as many times as you wish. Find the **CURVE SCALE** control below the center of the spectral display, to the right of the **HISTORY** control. (Note: If you have selected any type of channel linking other than **NONE**, scaling the current curve will result in changes to the inactive channel's curve. See **Details, details: Understanding Channel Linking.**)

Note: If any type of Channel Linking is active, **CURVE SCALE** will scale both channels' filter curves.

Smooth ⑥



As the name implies, the **SMOOTH** slider allows you to smooth your filter response curve. Drag the slider to the right to smooth your curve. The farther the slider is moved, the more pronounced the smoothing effect. Use this

function to easily clean up your filter curve, particularly one drawn freehand. The **SMOOTH** slider's knob always snaps back to the starting position when the mouse button is released, so smoothing may be applied many times in succession. Find the **SMOOTH** control below the spectral display, to the right of the **CURVE SCALE** slider.

Tip: Smoothing your curve multiple times by a small amount will yield a different result than a single large application.

Modes

SMOOTH may be operated in one of two modes. The default action of the **SMOOTH** slider is to smooth your entire EQ curve. However, if overdone, this could greatly reduce variation you may have intentionally built into your EQ. Mode two, which is accessed by pressing the **OPTION [CTRL]** key while operating the **SMOOTH** slider, only smooths your last edit. This gives you the freedom to clean up a curve drawn freehand without risk of losing the general shape and effect of your EQ.

Note: If any type of Channel Linking is active, **SMOOTH** will smooth both channels' filter curves.

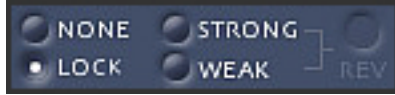
Channel Edit and Linking

Channel Edit



Two large buttons, **L** and **R**, are found at the very bottom, left side of the Firium window. Use the **L** button to select the left channel for editing. Use the **R** button to select the right channel. The left channel, **L**, is active by default. If you are editing in **LOCK** mode (see **Channel Linking: LOCK**, below), your channel selection will determine which filter curve is in the front and visible.

Channel Linking



The five buttons to the right of the channel selection buttons allow you to specify how changes to one channel will affect the other.

For your convenience, the type of linking you have selected appears at the top left side of the spectral display. Your selections in this area are maintained when switching between workspaces.

NONE. Use to specify no linkage between channels. Changes to one channel's filter response curve will have no effect on the unselected channel. Use this mode to edit each channel completely independently.

Tip: After editing channels separately using **NONE**, change to **STRONG** linking to have subsequent edits apply to both channels without losing the differences between channels.

CHANNEL LOCK. Use to “lock” the unselected channel's curve to that of the currently selected channel. This permits the selected channel to act as a master for both channels. When **CHANNEL LOCK** is applied, both channels will have the exact same filter response curve and will be edited as one. Note that you will lose any changes you have made to the unselected channel's filter response when you select this mode.

Tip: Use **LOCK** to copy the current channel's EQ to the unselected channel.

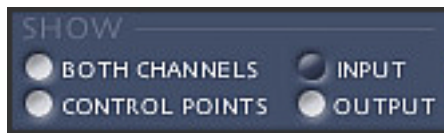
STRONG. Changes made to controls on the selected channel's curve will cause the unselected channel to take the identical value *at the edited point(s)*. Note that the left and right channels' entire filter curves will not be exactly the same unless the entire curve is edited in this mode. If you wish for both channels to have exactly the same filter response, use the **CHANNEL LOCK** mode instead.

Tip: When using **STRONG** or **WEAK** linking, turn on **BOTH CHANNELS** so you can keep an eye on the changes that are being made automatically to the unselected channel.

WEAK. Causes a relative change between channels. Changes to a selected channel's curve will cause the unselected channel's curve to change by an equal amount. Note that the *value* of the unselected channel's filter response at the edited point will not necessarily equal that of the selected channel. If you have edited the left and right channels individually, you can use **WEAK** to make modifications to both channels at once while maintaining the difference between the filter curves.

REV. Causes changes in one channel to have a reverse effect on the other channel. **REV** may only be used with either **STRONG** or **WEAK** linking selected.

Show ⑧



Controls in this section allow you to specify what is shown in the spectral display. For your convenience, your selections in this area are maintained when switching workspaces.

BOTH CHANNELS. Use to see both the left and right channels' filter response curve and spectra, if applicable, in the spectral display. Whether the spectra appear in the plot is determined by your other Show selections (see **INPUT** and **OUTPUT** in this section). Turn **BOTH CHANNELS** on, the depressed state, to see information pertaining to both channels in the spectral display. When off, only information relating to the currently selected channel is shown. Deciphering information in the plot can quickly become difficult when the spectra of both channels are being displayed. We suggest only using this option with either the input *or* the output spectra selected to be viewed, but not both.

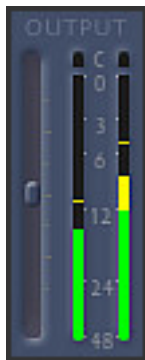
CONTROL POINTS. Use to display or hide the control points. Keep in mind that coupling can only be used when **CONTROL POINTS** is on. You may, however, still draw freehand when the control points are off.

Note: Only freehand drawing is available when the control points are off.

INPUT. Select to display the spectrum of the input signal of the currently selected channel. If **BOTH CHANNELS** is on, the input spectra of both the left and the right channel will appear in the spectral display.

OUTPUT. Select to display the spectrum of the output of the currently selected channel. If **BOTH CHANNELS** is on, the output spectra of both the left and the right channel will appear in the spectral display. The output spectrum always reflects the effect of your EQ on your audio signal – even while editing.

Output Trim and Meters ⑨



To the right of the spectral display you will find the output trim fader and stereo output peak meters. The output trim fader allows you to attenuate your output signal by -24 dB or amplify it with a gain of $+24$ dB. Use the output trim fader to cut the output if your EQ causes clipping, or boost it if it causes a drop in level. Press SHIFT [SHIFT] then click on the output trim fader, to reset the fader to zero (0) dB. The current output trim setting is displayed at the top, right corner of the spectral display.

Meters are located beside the output trim fader. The stereo peak meters give an accurate reading of the post processing levels of your audio. Each meter contains a peak hold bar to show the highest level reached. The peak hold time is three seconds. Individual overload indicators are located at the top of each channel's meter. When a sample exceeds zero (0) dB, an overload condition is triggered and the indicator will light. Reset the overload indicators by clicking directly on them or the space between the meters.

Load and Save 10



The **LOAD** and **SAVE** controls are located to the right of the spectral display, below the meters and output trim fader. Firium gives you the functionality to save your filter response to disk for future use as a pre-set.

LOAD. Press **LOAD** to select a preset or saved filter to load from disk. When you press load you will be presented with a standard dialog box where you should indicate which Firium settings file you wish to load.

SAVE. Firium gives you the functionality to save the EQ in your current workspace to disk for future use as a preset. Both channels' curves will be saved. Pressing **SAVE** opens a standard dialog box enabling you to specify a name for the saved file and the folder where it should be placed. For your convenience, the entire state of your workspace is saved. This includes your coupling settings, channel, linking and Show selections, and the amount of trim you have specified with the output trim fader.

Using the integrated **SAVE** and **LOAD** gives you the freedom to create elaborate EQs that can be loaded and used in any host.

Details, details

The preceding sections gave you a thorough overview of Firium's interface and showed you how to use Firium to create your EQ. However, if you want a little more detail on using Firium, this section is for you.

Supported Sampling Rates

Firium supports sampling rates of 88.2 kHz, 96 kHz and even 192 kHz. Of course, Firium can be used with lower sampling rates, as well. The sampling rate Firium uses is determined by, and also limited by, the sampling rates available in your host application. There is no need to configure Firium to use the higher sampling rates. If a sampling rate of 44.1 kHz is in use, Firium will operate at 44.1 kHz; if a sampling rate of 96 kHz is in use, Firium will use that sampling rate.

Sampling Rates below 44.1 kHz: If you are using a sampling rate below 44.1 kHz you will notice that the frequency axis of the spectral display changes. Audio at lower sampling rates contains information over a smaller range of frequencies. The spectral display's frequency axis changes to display the range of frequencies available in your audio. For example, if you are using Firium on audio at 22 kHz, the frequency display will show a maximum frequency of about 11 kHz, as that is the highest frequency contained in audio sampled at 22 kHz. The lower the sampling rate, the smaller the maximum frequency.

More About the Spectral Display

Use the spectral display to analyze and shape the frequency content of your signal. Easily pick out problem areas in your audio then, after you've developed your filter, view both the input and output spectra and compare the effects of Firium's EQ – a before and after analysis.

When you initially open Firium, the filter response curve is flat at zero (0) dB, the Channel Linking mode is **LOCK**, and the left channel is selected.

As a reminder, here are the plots you may see in the spectral display in addition to the filter curves:

LEFT CHANNEL	
Input	Dark blue
Output	Bright blue
RIGHT CHANNEL	
Input	Dark red
Output	Bright red

For your convenience, your view selections, as indicated in the **SHOW** area of the interface, will remain the same when switching between channels or workspaces.

Editing Your Curve

There are several editing modes available when the cursor is within the spectral display.

Freehand Drawing Mode. This is the default editing mode. Freehand drawing is available whenever in the Spectral Display and not directly over a control point. To edit your filter response in this mode, simply draw inside the Spectral Display. For pinpoint editing, press your mouse button and the control point nearest the point you click, will snap to that location. With the button pressed, you may draw your filter response freehand. Control coupling does not apply when drawing freehand. Keep in mind that freehand drawing is not active if you are pressing any modifier keys.

Tip: The gain and frequency corresponding to the cursor's current location is displayed at the top of the spectral display. Use this information for pinpoint editing of individual controls.

Coupling Mode. When the cursor is passed over a control point, and dynamic linking is not active, a white circle surrounds the control to indicate that you are in "regular" coupling mode. While the white circle is visible, press your mouse button to drag the selected control vertically, up and down. When editing in this manner, neighboring controls will move according to the type

and level of coupling you have selected with the coupling display. Each control is capable of ± 18 dB of gain.

Dynamic Coupling Mode. When the cursor is passed over a control point, and dynamic linking is active (**DYN** is visible in the coupling display or the OPTION [CTRL] key is depressed), Dynamic Coupling Mode is activated. A green circle surrounds the control to indicate that you are in dynamic coupling mode. While the green circle is visible, move the selected control vertically to change its gain. Move horizontally to dynamically change the degree of effect the selected control exhibits on other controls.

Curve Shifting Mode. When the SHIFT [SHIFT] or CMD [CTRL+SHIFT] key is pressed, curve shifting mode is activated (see **Hidden Functionality: Curve Shift**). Pressing the SHIFT [SHIFT] key enables you to move your filter response curve up and down. Pressing the CMD [CTRL+SHIFT] key enables left and right shifting of the filter curve. Large arrows appear behind the plot to remind you which curve shifting mode is active.

Understanding Strong and Weak Linking

Remember, the type of linking you have selected determines how changes to the current filter curve will affect the inactive filter's curve (see **Navigating Around Firium: Channel Edit and Linking**).

When **WEAK** linking is selected, changes to the active channel's filter curve cause a change by an equal amount in the unselected filter curve.

Example: If you are editing the left channel and have **WEAK** linking selected, moving control point three (3) up 10 dB will cause point three (3) of the right channel to move up by 10 dB. Note that this does not mean control point three of both channels will have the same value. If the left channel's value had initially been 1 it would subsequently be 11; if the right channel had been 2 it would then be 12.

When **STRONG** linking is selected, changes to the active channel's filter curve cause the unselected filter curve to take the *exact* same value. If **STRONG** linking were selected in the previous example, the left channel's new value would be 11 dB and the right, unselected channel's new value would also be 11 dB.

No, don't say It

Delay. Yes, we said it. All FIR filters introduce a delay into the signal – it's just the nature of the beast. Since you are designing an FIR filter with Firium, there will be a delay introduced into your signal. But wait! In exchange for the delay you get completely transparent EQ with *no* smearing, and *no* phase distortion – a worthwhile trade off in our book.

Note: Most modern host applications will automatically compensate for plug-in induced delay. Check your host's documentation for this feature.

Firium is a mastering EQ, primarily designed for use on the master output. When used in this manner, because you are processing the final output and, in most cases, do not need to synchronize with any other audio, the delay Firium introduces is not an issue. If you choose to use Firium in another manner, you may need to consider and adjust for the delay that is introduced.

So you may compensate for the delay, if needed, an indicator is located at the top, left side of the spectral display showing the amount of delay, in samples, Firium has introduced into your audio. Some host applications will automatically adjust for plug-in induced delay. If your host does not offer this feature and you are using Firium somewhere other than the master output, you will need to shift your audio to the left a number of samples equal to the amount of delay indicated. The amount of delay introduced by Firium depends on settings in your audio processing application.

Now that wasn't so bad, was it?

Hidden Features

Curve Shift

Up and Down Shifting

Press **SHIFT** [SHIFT] and drag up and down in the spectral display to shift your entire filter curve up or down. This changes the gain of your entire curve by the amount of the shift. When used with no linking selected, this is useful to correct stereo level imbalances. Firium indicates the number of decibels your curve has been offset at the bottom, middle of the spectral display.

Left and Right Shifting

Press **CMD** [CTRL+SHIFT] and drag left and right in the spectral display to shift your entire filter to the left or right. This changes the frequencies at which your EQ is active. Oh, and its kind-of cool to see the balls rolling.

Smooth Last Edit

Hold down **OPTION** [CTRL] while operating the **SMOOTH** slider to only smooth your last edit.

About Box/Modifier Key List

Click on the Firium name or the Elemental Audio Systems logo to display the Firium About Box. The About Box displays some important and helpful information. In addition to the version number, you will find a list of Firium's modifier keys and their function.

Modifier Keys

Some portions of Firium’s interface exhibit different behavior if you depress a key, referred to as a “modifier” key, while they are operated. For example, holding down **OPTION [SHIFT]** while moving the **SMOOTH** slider knob will smooth just your last edit instead of the entire filter curve. This section lists all the modifier keys you can use to access alternate functionality in Firium. You must press and *hold down* a modifier key while operating a control. Pressing these keys alone will not perform any action. Only certain controls have alternate behavior. Consult the appropriate area in the manual for more information on using a control’s associated modifier key. You can see a list of these key modifiers at any time by clicking on the Firium name or the Elemental Audio Systems logo.

Tip: You can see a list of Firium’s key modifiers at any time by clicking on the Firium name or the Elemental Audio Systems logo.

Mac	
OPTION	Dynamic coupling (when in plot) Smooth most recent edit (smooth slider)
SHIFT	Move filter curve up and down Reset output gain fader
CMD	Move filter response curve left/right

Windows	
CTRL	Dynamic coupling (when in plot) Smooth most recent edit (smooth slider)
SHIFT	Move filter curve up and down Reset output gain fader
CTRL+ SHIFT	Move filter response curve left/right

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