



BigSeq2 User's Guide

Audio Damage, Inc.

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System Requirements

BigSeq2 is provided as both a VST and an AudioUnit plug-in for Windows and MacOS X. The MacOS X version is a Universal Binary, compatible with both Intel- and Motorola-based Macs.

To use BigSeq2, you'll need a Steinberg VST-compatible host application which conforms to the VST 2.0 specifications, and a computer capable of running it. Note that BigSeq2 requires tempo and transport-synchronization information from its host, and hence will not work with programs that do not supply this information such as Sound Forge.

For the AudioUnit version of BigSeq2, you'll need an application capable of hosting AudioUnit plug-ins, and a computer capable of running it. The following specifications represent minimum requirements.

For use with Microsoft Windows:

- Windows XP or Vista
- 512 MB RAM
- Pentium III 600 MHz CPU
- High Color S-VGA Display

For use with Apple Macintosh:

- Mac OS X version 10.4 or newer
- 512 MB RAM
- Motorola G4/G5 or Intel CPU
- Display capable of "thousands of colors"

Installation

Double-click the BigSeq2 Installer icon and follow the instructions. During the installation process the installer will ask you to enter your registration code. Your registration code uniquely identifies your purchase, and you will need it if you need to reinstall your plug-in (for example, after upgrading to a new computer). Keep a copy of the code in a safe location and please don't share it with your friends. We're delighted if you like our products so much that you want to share them, but please ask your friends to buy their own copy so that we can keep making new products.

To un-install from OS X, simply delete the plug-in from your VST folder, which is usually located at `/Library/Audio/Plug-Ins/VST/`, and your AudioUnits folder, which is located at `/Library/Audio/Plug-Ins/Components/`. To un-install from Windows, simply delete the plug-in from your VST folder, which is usually located at `C:\Program Files\Steinberg\VstPlugins`.

Introduction

Thanks for purchasing BigSeq2, an extensive (dare we say "massive") upgrade to our BigSeq gate sequencer plug-in. BigSeq2 starts with BigSeq's original concept, gating an audio track rhythmically, and turns it on its ear with the addition of nine other effects, all of which can be sequenced.

BigSeq2 consists of six "blocks," each of which has its own time base, two sequencers, and one to three effects. These effects can be turned on and off via the Gate Sequencer of that block, and their values can be controlled with the Modulation Sequencer for that block. To make matters even more complicated, you can drag the individual blocks around to change the order the effects occur.

That preceding paragraph makes the plug-in sound fairly complex, and we'd be lying if we told you it wasn't. But it's easier than you think. Go play around with the presets for a while, and it'll start to make sense. Then come back and read this manual. You'll have a better understanding of what's possible, and probably find a few tricks you didn't see immediately.

The Sequencers

Each of BigSeq2's six effects blocks has its own pair of step sequencers, a Modulation Sequencer and a Gate Sequencer. The Modulation Sequencer varies (modulates) one or more of the block's parameters, while the Gate Sequencer simply turns the block on or off. These sequencers enable BigSeq2 to create complex, evolving sounds synchronized to your music. All of the sequencers run independently, but are always locked to your host DAW's transport. When your host program starts playing, BigSeq2's sequencers start running; when your host stops, so does BigSeq2.

All of the sequencers operate the same way for each block. We'll describe the Gate Sequencer first since it's a little simpler.

Gate Sequencer

An effects block's Gate Sequencer turns the block on or off. If every step of the Gate Sequencer is turned off, the effects block won't do anything audible. Here is what the Gate Sequencer looks like:



The row of squares represents the 32 steps in the sequence. If a square is shaded, that step's gate is turned on. In the above illustration, the first, third, fifth, etc. steps are turned on. You can turn steps on and off individually by clicking on them, and you can turn several or all of them on or off by clicking on one and dragging across others.

At the bottom right of the Gate Sequencer panel are three buttons. When you click the **RAND** button, the gates will be randomly set either on or off. About half of the gates will be turned on and about half will be turned off every time you click the **RAND** button. When you click the **CLEAR** button, all of the gates are turned off. This silences the effects block and gives you a blank slate upon which to draw a new pattern.

The **RESET** button is an on/off toggle switch. When turned on, the Gate Sequencer automatically randomizes the gates every time the sequencer starts playing from the beginning. Turning **RESET** on is like clicking the **RAND** button every time the sequencer starts the beginning of its pattern, except that BigSeq2 does the clicking for you.

The small rectangles immediately below the squares are the gate locks. (That little symbol to the left of the row is a stylized image of a padlock.) When a step's gate lock is turned on, that step is not affected by the **rand**, **reset**, and **clear** buttons. A locked gate will remain either on or off when you click **RAND** or **CLEAR**, and when **RESET** is turned on. You can still turn the gate on or off by clicking it with the mouse. The gate locks let you keep parts of the gate pattern the same while other parts change randomly, producing patterns that have some resemblance to each other but change over time.

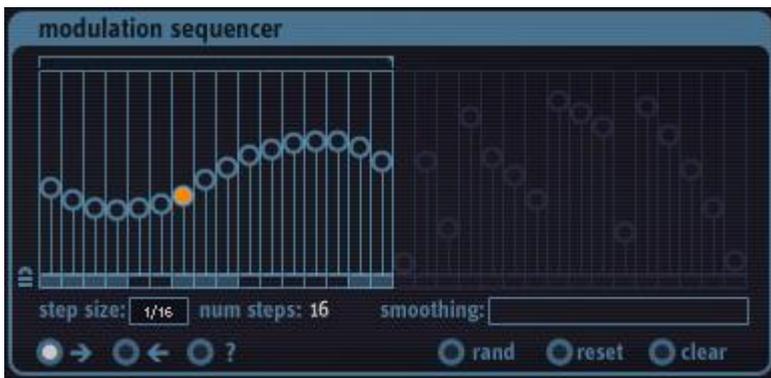
The **GLOBAL RESET** popup menu at the bottom left of the Gate Sequencer panel determines whether, and how often, the effects block's sequencers are reset to their first position when your host DAW's transport reaches the beginning of a measure. Since BigSeq2's sequencers can have patterns of any length from one to 32 steps long, and since the steps can have lengths other than simple durations like an eighth note, the sequencers can potentially reach the end of their pattern at times that do not line up with the measures (or major beats, e.g. quarter notes) of your host sequencer. Sometimes this is desirable since it can create effects that move in and out of phase with your music in interesting ways. Other times, however, it is useful to always have BigSeq2's sequencers jump back to their first step at more predictable times, regardless of what they're currently doing.

If the **GLOBAL RESET** menu is set to "Off", the sequencer will not be reset automatically in response to the host DAW's actions. The sequencer will merrily cycle along by itself, synchronized to your music's tempo but willfully ignorant of the placement of your music's bar lines. If the **GLOBAL RESET** menu is set to any of its other choices, which are "1 Measure" through "4 Measures", the sequencer will jump back to its first step whenever your host DAW's transport crosses the corresponding number of bar lines. For example, if the **GLOBAL RESET** menu is set to 2 Measures, BigSeq2's sequencer will jump back to its first step at the beginning of every other measure.

Note that the **GLOBAL RESET** menu affects both of the sequencers in all of the effects blocks. Each pair of sequencers can have a different number of steps and step size (as we'll describe shortly) and hence can advance and cycle independently, but when a bar line triggers a reset in response to the **GLOBAL RESET** setting, all of BigSeq2's sequencers jump to their first steps.

Modulation Sequencer

Each effects block has its own Modulation Sequencer. This sequencer can vary the values of the effects block, changing a simple static audio effect into something that changes with the rhythm of your music.



The main feature of the Modulation Sequencer panel is its row of 32 vertical sliders. Each is topped with a circular handle; the handle of the current step of the sequencer is filled with orange. You can click anywhere within a slider and its handle will jump to the position of your mouse pointer. You can also click and drag across the sliders to move a number of them with one gesture.

Above the sliders is a bracket-like control. This control sets the number of steps over which the sequencer will cycle, from one to 32. Click and drag above the sliders to move

the right end of the bracket, setting the number of active steps. Inactive steps are dimmed and cannot be changed with the mouse. There is also a handy display of the number of active steps below the sliders, labeled (not surprisingly) "num steps".

The number of active steps is the same for both the Modulation Sequencer and the Gate Sequencer beneath it. The two sequencers advance from one step to the next in unison. However, since each effects block has its own pair of sequencers with their own set of controls, and since the sequencers advance independently of each other, each effects block can have a different sequence length. For example, the VCA sequencers can have 16 active steps while the Delay sequencers have 23 active steps.

The popup menu below the sliders and on the left, labeled **STEP SIZE**, sets the duration of the sequencer steps, relative to your host DAW's current tempo and meter. Put another way, the **STEP SIZE** menu controls how quickly the sequencers advance from one step to the next. The step size is expressed in units of beats. Here are a couple of examples. If the step size is 1/8, and your host DAW's time signature is set to 4/4, BigSeq2's sequencer will advance eight steps for each measure of music, since there are eight eighth notes in a measure of 4/4 time. If you're working on an uptempo waltz and have set the time signature to 3/4 and the step size to 1/16, BigSeq2's sequencer will advance 12 steps in each measure, since there are four 16th notes in each of the three beats of a measure of 3/4 time, and three times four is 12.

The **STEP SIZE** control affects both the Modulation Sequencer and the Gate Sequencer. Each effects block's sequencer can have its own step size setting. This means that BigSeq2's sequencers can have very complex interrelations since they each have their own number of steps and step size settings.

In the lower-left corner of the Modulation Sequencer panel is a row of switches for setting the play direction for the sequencer. If the button labeled "➔" is selected, the sequencer plays steps in order from left to right. (This is probably the mode in which you would expect the sequencer to operate.) If the button labeled "➔" is selected, the sequencer plays in the opposite direction, moving from right to left. After it plays the leftmost step it jumps back to the last active step. If the **GLOBAL RESET** control is set to something other than Off, the sequencer will jump to this rightmost active step whenever the host DAW reaches the beginning of a measure which resets the sequencer. Finally, if the button labeled "?" is selected, the sequencer chooses its next step at random, jumping unpredictably among the active steps. These switches affect the operation of both the Modulation Sequencer and the Gate Sequencer.

At the bottom right of the Gate Sequencer panel are three buttons. Their function is nearly identical to that of the buttons with the same names in the Gate Sequencer. When you click the **RAND** button, the Modulation Sequencer sliders will be to randomly chosen values. When you click the **CLEAR** button, all of the sliders are set to zero, their lowest position.

The **RESET** button is an on/off toggle switch. When turned on, the Modulation Sequencer automatically randomizes its sliders every time the sequencer starts playing from the beginning. Turning **RESET** on is like clicking the **RAND** button every time the sequencer starts the beginning of its pattern.

The small rectangles immediately below the Modulation Sequencer sliders are the slider locks. (That little symbol to the left of the row is a stylized image of a padlock.) When a step's slider lock is turned on, that step is not affected by the rand, reset, and clear buttons. A locked slider will retain its value when you click **RAND** or **CLEAR**, and when **RESET** is turned on. You can still change the slider by clicking it with the mouse. The slider locks let you keep parts of the modulation pattern the same while other parts change randomly, allowing you to create variations of patterns with common values.

The horizontal slider labeled **SMOOTHING** controls whether the output of the Modulation Sequencer jumps from one value to the next or moves in a ramp-like manner. If the slider is moved all the way to the left (such that the box appears to be empty), the output of the Modulation Sequencer will immediately jump between the values set by the vertical sliders as the sequencer moves from one step to the next. If you drag the smoothing slider to the right, the Modulation Sequencer's output will slide from one value to the next. The amount of smoothing is not affected by the host DAW's tempo, so it is possible to set the smoothing slider to a high-enough value that you'll hear little or no change in the sequencer's output.

By now, if you're still paying attention, you're probably thinking "well, this is all very elaborate and nice, but what does the Modulation Sequencer actually *do*?" As we've said, the Modulation Sequencer can control the parameters of the effects block. But before we describe how this actually works, we need to look at the effects blocks themselves and their parameters. We'll describe how the Modulation Sequencer controls those parameters in the section titled "Modulation", later on. You can skip ahead if you're feeling impatient.

The Effects Blocks

Each of BigSeq2's effects blocks has its own set of controls. These controls appear in the panel labeled Effect on the right side of BigSeq2's window. The controls for the current effects block appear in the panel; only one effects block's controls appear at a time. The current effects block is indicated by the illuminated box in the Routing panel. Click on the boxes to bring the desired effects block's control into view in the Effect panel.

Each effects block has two to five knobs for controlling the effect, shown as an arc of illuminated segments in the panel. The name and value of each parameter is displayed in the lower-right section of the knob. Click and drag vertically on the knobs to change the associated parameter. Most knobs also have a modulation-depth slider; we'll talk more about this slider later on in the section titled Modulation.

Next we'll look at the controls for each effects block.

VCA

The VCA effects block is BigSeq2's most important block, and also its most oddly named. Its name is borrowed from analog synthesizer parlance; the letters "VCA" stand for Voltage Controlled Amplifier. In a synthesizer, the VCA is typically used to control the overall loudness and shape of the sound. An analog voltage controls how much a signal is amplified; by changing the shape of the voltage, you change the shape of the sound. Obviously BigSeq2's VCA is entirely digital and responds to numbers rather than voltages, but we chose the name VCA because of its familiarity¹.

¹ Moreover, the term Voltage Controlled Amplifier is slightly misleading. Almost all VCAs found in synthesizers have a maximum gain of unity; that is, they don't actually amplify the signal, in the sense that "amplify" means "make louder". They make the signal quieter or (at most) pass it without alteration. Hence a VCA would be more accurately described as a Voltage Controlled Attenuator, but who are we to argue with the terminology chosen and made popular by Dr. Robert Moog?

To return to the actual point, the VCA effects block is a gate effect controlled by its sequencer. Together they turn the signal on and off in time with your music and are more than capable of creating the rapid, rhythmic gating effect commonly heard in a number of forms of electronic dance music. The VCA can also be used to chop pieces out of drum loops, bass lines, vocals, synthesizer riffs, etc., creating new parts that can be processed by BigSeq2's other effects.

The VCA's **ATTACK** and **DECAY** knobs control how quickly the gate turns on and off (or opens and closes). The **ATTACK** knob controls how rapidly the gate turns on, allowing the signal to pass; the **DECAY** knob controls how rapidly the gate turns off, blocking the signal. If you leave both knobs at their lowest setting of 1msec (that is, one one-thousandth of a second), the gate will open and close nearly instantly when triggered by the sequencer. As you turn the knobs up, the **ATTACK** and **DECAY** times lengthen, making the signal fade in and out as it passes through the VCA. Note that these controls work in units of absolute time and are independent of the tempo of your music. This means that at faster tempos, longer **ATTACK** and **DECAY** settings can cause the gates to overlap. This can be useful for creating tremolo-like effects.

The **GATE** knob controls how long the gate stays open, expressed as a percentage of the sequencer step size. If the **GATE** knob is turned fully clockwise, the VCA stays open for the entire duration of each step, that is, for 100% of the duration of the step. If **GATE** is set to 100% and the VCA is turned on by adjacent active triggers in its Gate Sequencer, you won't hear any gaps between one step and the next. At smaller values, the VCA stays on for a fraction of the duration of the step. Very small values may silence the signal altogether, particularly if the **ATTACK** and **DECAY** knobs are turned up.



The **DEPTH** knob controls the overall intensity of the VCA. It controls how much the VCA attenuates the signal when it is turned off. If **DEPTH** is set to 100%, the signal is completely silenced when the VCA is turned off—that is, at each step for which the VCA's Gate Sequencer is off. On the other hand, if **DEPTH** is set to zero, the signal's loudness is the same regardless of whether the VCA is on or off and the VCA has no effect on the signal. At intermediate settings the **DEPTH** control allows some of the signal to pass when the VCA is off, thus controlling the contrast between the loud steps (when the VCA is on) and the quiet steps (when the VCA is off).

Finally, the **PAN** knob controls the perceived stereo position of the VCA's output. Rotate the knob to the left and the sound will move towards the left speaker; rotate it to the right and the sound will move towards the right.

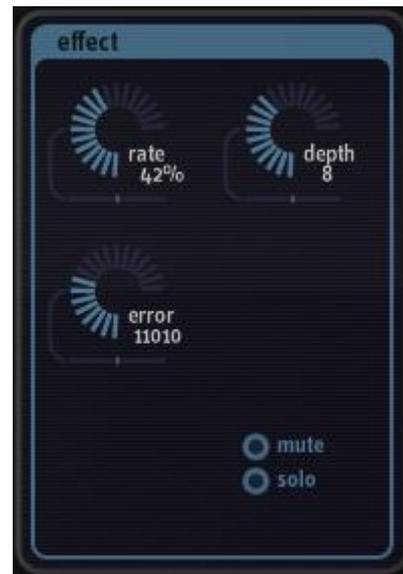
Bits

The Bits effect block is a multi-purpose digital distortion processor. **BITS** creates the popular "lo-fi" sample-rate reduction and bit-crusher digital effects we've all come to know and love despite having 24-bit audio converters and 64-bit signal-processing math readily available to us.

BITS has three knobs. The first knob, **RATE**, controls a sample-rate reducer. As you turn this knob up, the signal is resampled at a lower rate than your host's current sampling rate. If this knob is turned all the way anti-clockwise, the resampling process has no effect on the signal. As you turn the knob up, the signal is sampled at a lower rate. If you turn this knob all the way clockwise, the signal is sampled at 1/100th of your host's sampling frequency (e.g., 441Hz if you use the usual sampling frequency of 44100Hz).

The second knob, **DEPTH**, controls a bit-depth reduction or "bit-crushing" process. If you leave the knob turned fully anti-clockwise, the signal is passed with full resolution. (Like most host-based plug-ins, BigSeq2 uses 32 bits to represent signals internally, but your host software may use 16, 24, or 32 bits.) As you rotate the knob, the number of bits used to represent the signal first drops to 16, and then decreases all the way to one as you turn the knob fully clockwise.

The third knob, **ERROR**, is an Audio Damage original. It introduces errors in the bits used to represent the signal. The knob controls how long the errors persist, and hence how much they damage the audio. If the knob is rotated fully anti-clockwise, no errors are added to the signal. As you rotate the knob, progressively more persistent errors are added to the signal, creating digital-sounding noise. The **BITS** and **ERROR** knobs are somewhat complementary in that the effect of the **ERROR** function is less noticeable at high settings of the **BITS** knob.



Delay

BigSeq2's Delay effects block contains a simple but versatile stereo delay. It can be used for both tempo-synced echo/repeat effects and modulation effects created by short delays such as simple chorusing, flanging, and doubling.

The switches in the lower left of Delay's panel control the maximum delay time. When the **DELAY** switch is activated, the delay has a maximum duration of two seconds. Also, when this switch is turned on, the delay time is synchronized to the tempo setting of your host software. As you adjust the time knob, you'll see that the delay time is expressed in rhythmic units. For example, if the time knob says "1/8", the delay time will be equal to the duration of an eighth note, regardless of the current tempo of your music. Dotted and triplet values are available and are denoted with a dot (.) and a 'T' respectively.

If the **CHORUS** or **FLANGE** buttons are activated, the delay time is not synchronized to your song's tempo, and has a value expressed in milliseconds (thousandths of a second). When the **CHORUS** switch is turned on, the maximum delay time is 100msec; when the **FLANGE** switch is on, the maximum is 10msec.

The **FINE** knob lets you adjust the delay time with more precision than the **TIME** knob offers by itself. The **FINE** control multiplies the **TIME** setting, and has a range from 0.5 to 2.0. In other words, the **FINE** knob adjusts the time shown on the **TIME** knob, from one-half that value up to twice that value. When the **DELAY** switch is turned on, the **FINE** knob lets you vary the echoes so that they are ahead of or behind the beat of your music. In the **CHORUS** and **FLANGE** modes, the fine knob controls the timbre of the effect. In these modes it is particularly useful to modulate the **FINE** knob with the Delay block's Modulation Sequencer.

The Feedback parameter, labeled **FDBK**, sends some of the delay's output back into its input. For longer delay times the **FDBK** knob controls how many times the echoed signal repeats before fading out altogether. If **FDBK** is turned all the way up to 100%, the delayed signal will repeat many times before it fades out. (It will eventually fade out. The Delay block includes some internal filtering which helps distinguish the delayed signal from the original.) In the **CHORUS** and **FLANGE** modes, the **FDBK** knob makes the effect sound thicker or more intense.



The **SEND** knob controls how much of the signal entering the Delay effects block actually passes through the delay itself. The input signal is always sent to the output of the Delay block without attenuation, so the **SEND** knob acts like an effects-send or aux-send knob on a mixing board. If the **SEND** knob is turned all the way down to zero, you won't hear any delayed signal. Note that you can use the Delay's Modulation Sequencer to control the **SEND** knob, routing more or less of the signal to the delay with each step.

Distort

The Distort effects block has two different distortion processors, named Fuzz and Warp, connected in series (one after the other). Each processor has a single knob.

The Fuzz processor is based on a model of a vintage distortion pedal popular with many guitarists. The **FUZZ** knob controls the intensity of the effect. Fuzz is perhaps most interesting at lower settings of the **FUZZ** knob, where it imparts a somewhat grainy distortion to signals regardless of their level. As you turn the knob up the distortion effect becomes more extreme. Note that the Fuzz processor always distorts the signal even when the knob is turned all the way down. (Obviously you can turn it off altogether with the Gate Sequencer.)

The Warp processor, technically speaking, distorts the signal by using a sinusoid as a non-linear transfer function. In less technical terms, it makes odd noises by wrapping the signal around a sine wave. It creates harsh distortion that can sound like hard clipping, or add metallic-sounding overtones somewhat like ring modulation. The **WARP** knob varies the frequency of the sine wave, and hence varies the timbre of the distorted signal.



Filter

The Filter effects block contains a filter (not surprisingly) with several different modes. The **FREQ** controls the cutoff frequency of the filter. Rotate the knob clockwise to increase the cutoff frequency.

The **RES** knob controls the resonance of the filter. As the resonance of a filter increases, the filter's output emphasizes frequencies near its cutoff frequency. In plainer terms, if you turn up the resonance knob, the filter sounds more "synthy". (Try it—you'll hear what we mean.) If the filter type is set to 4P LP (see below) and you turn the resonance knob fully clockwise, the filter will oscillate, producing a sustained tone even if the plug-in has no input signal. Some of BigSeq2's presets, such as "Self Osc Acid", use the self-oscillating filter to turn BigSeq2 into a mini sequenced synthesizer.

The **TYPE** knob switches the filter between several different filter models. As you rotate the knob, watch the knob's display to see which filter type is active. The available types are:



- Four-pole low pass (shown as "4P LP" in the parameter display) – the filter type most commonly found in synthesizers. A low-pass filter attenuates or reduces signal frequencies greater than its cutoff frequency and passes signal frequencies below its cutoff frequency without alteration. As you rotate the frequency knob clockwise, the filter passes more of the signal's high-frequency content and the output sounds brighter. If you turn the frequency knob fully counter-clockwise, you may not hear any output at all because the entire signal has been filtered out.
- Three-pole low pass (shown as "3P LP"): A low-pass filter with a frequency roll-off curve that is less steep than that of the four-pole filter. Three-pole filters are fairly uncommon, but the three-pole low-pass filter found in a certain bass-line synthesizer defines entire genres of electronic music.
- Two-pole low pass (shown as "2P LP"): A low-pass filter with a frequency roll-off curve that is less steep than either the three-pole or four-pole low-pass filter. Two-pole filters are usually used for gentler frequency-shaping applications, such as in equalizers or tone controls, but are found on some synthesizers.
- Four-pole high pass (shown as "4P HP"): A high-pass filter works in a manner opposite to that of a low-pass filter: it reduces signal frequencies less than its cutoff frequency and passes signal

frequencies above its cutoff frequency without alteration. As you rotate the frequency knob clockwise, the signal loses its lower frequencies and the output sounds thinner. If you turn the frequency knob up far enough, you might not hear anything at all because the entire signal has been filtered out.

- Two-pole high pass (shown as "2P HP"): If you've been paying attention you can probably figure this one out for yourself, right? It's a high-pass filter that has a less steep attenuation curve than the four-pole high-pass filter. Use it when you want to create a thinner sound without the drastic low-frequency reduction of the four-pole high-pass filter.
- Four-pole band pass (shown as "4P BP"): A band-pass filter allows a range of frequencies centered on the cutoff frequency to pass and attenuates higher and lower frequencies. The width of the band of frequencies is controlled by the Resonance control. Wah-wah pedals used by guitarists are based on band-pass filters.

Freq

The Freq block contains a frequency shifter. A frequency shifter is a somewhat unusual beast in signal processing and bears some explanation. For starters, a frequency shifter is not the same thing as a pitch shifter. (If you're looking for a pitch shifter, we suggest you head to our website at www.audiodamage.com and read about Discord 2, our powerful and entertaining pitch-shifter plug-in.) The difference is that a pitch shifter *multiplies* all of the frequency components of a signal by some number, which preserves their harmonic relationship to each other. A frequency shifter *adds* some number to all of the frequency components of the signal. This means that the harmonics of the signal no longer form the original ratios with each other, and the timbre of the signal changes, becoming inharmonic and sometimes metallic-sounding². At small shifting intervals, frequency shifting can create lovely detuning and chorusing effects.

² Frequency shifting is a close relative of ring modulation, which also produces metallic-sounding timbres. The difference is that ring modulation creates two sets of frequency components: one set of components of higher frequency than the original, and one set lower than the original. Frequency shifting creates only one set of frequency components, which can be higher or lower than the components of the original signal. Hence a frequency shifter sort of creates half of the effect of a ring modulator. Somewhat paradoxically, a frequency shifter is much more complicated to create—in either software or hardware—than a ring modulator.

The Frequency Shifter block has four knobs. The first knob, **SHIFT**, controls how much the signal's frequency is shifted. This knob has a range of -800Hz to +800Hz. A shift amount of zero produces no effect. Positive amounts shift the signal upwards in frequency, negative amounts shift it downwards.

The second knob, **FINE**, also controls the shift interval, but has a much smaller range of -10Hz to +10Hz. The value of this knob is added to the value of the **SHIFT** knob to determine the how much the signal is shifted. For example, if the **SHIFT** knob is set to -56Hz and the **FINE** knob is set to 5Hz, the signal will be shifted down by 51Hz. To create subtle phasing and detuning effects, leave the **SHIFT** knob at zero and vary the **FINE** knob.

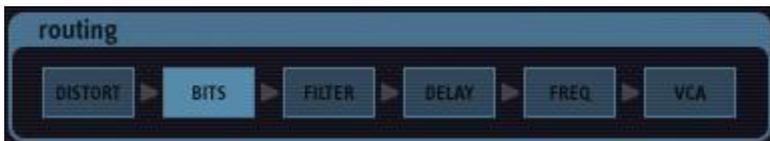
The feedback knob, abbreviated **FDBK**, sends some of the pitch-shifted signal back into the pitch shifter. This usually intensifies the pitch-shifting effect.

The **MIX** knob controls the relative loudness of the original signal and the pitch-shifted signal. If the knob is rotated fully anti-clockwise (so that the value is 0%) you'll hear only the original signal and none of the pitch-shifted signal. If you rotate the knob fully clockwise, you'll hear only the pitch-shifted signal. At the center, 50% position, you'll hear equal amounts of the original and shifted signals.



Routing

As we've mentioned previously, the six signal processing blocks in BigSeq2 can be arranged in any sequence. The Routing panel near the bottom of BigSeq2's window shows the current order of the blocks, and lets you rearrange them.



The order of the blocks in the routing panel reflects the order in which the signal passes through them, from left to right. In the picture above, the signal first goes through the Distort block, then through the Bits block, then through the Filter, and so on.

You can rearrange the order of the blocks by clicking and dragging them. As you drag a block to the left or right, the other blocks will scoot out of its way, allowing you to drop the block wherever you want in the sequence.



Common Controls: Solo and Mute

Each of BigSeq2's effect panels has two switches labeled **SOLO** and **MUTE**. The **SOLO** and **MUTE** switches act in a manner similar to that of the solo and mute controls commonly found in mixers. When an effect's **SOLO** switch is illuminated, you will hear only that effects block in action; the other blocks will be silenced. Only one effects block can be soloed at a time. If you turn on the **SOLO** switch for, say, the Filter block, switch to the Distort block and turn on its **SOLO** switch, you will then hear only the Distort block. The **MUTE** switch silences the effects block. More than one block can be muted at a time. The **SOLO** and **MUTE** switches toggle on and off. Click them to switch them between their on and off states. Since the VCA is BigSeq2's main effect, it has no **MUTE** button.

Output Controls

In the lower right of BigSeq2's window are two simple but useful controls. The **OUTPUT** knob controls BigSeq2's overall output level. Use it to make BigSeq2 louder or softer as needed. The **OUTPUT** knob has a range of -40dB to +6dB, so it can boost quiet signals or tame overly loud noises.

The **ACTIVE** button effectively turns BigSeq2 on and off. When the **ACTIVE** button is dimmed, BigSeq2 has no effect on the incoming signal and passes it through without alteration. Click on the active button to turn it on and off.

Modulation

BigSeq2's power lies in its modulation features—that is, the manner in which its Modulation Sequencers can control (modulate) the parameters of the effects blocks. We've described how each effects block has a pair of sequencers, and what parameters each effects block has; now we'll describe how they work together. We'll use the following screenshot as an example.

First notice that the sequencer step size is set to 1/16 and the number of steps is 32. Assuming that the host sequencer's time signature is set to 4/4, this means that the step sequencer will advance one step with each sixteenth note, and it will take two measures for the sequencer to cycle through all of its steps.

We've selected the frequency shifter effects block, as shown by the illuminated **FREQ** box at the bottom. The effect panel shows the frequency shifter's controls. Notice the horizontal sliders beneath each knob. These are the modulation depth sliders that we mentioned earlier. The sliders are bidirectional; if left at their center setting, the parameter is unaffected by the Modulation Sequencer. In the illustration above, the **SHIFT** and **MIX** parameters' modulation sliders are set to zero. Click and drag on the sliders to move them to the left or right. Hold down the CTRL key on your PC's keyboard, or the CMD key on a Macintosh keyboard, and click on a slider to reset it to the center-zero position.



If a modulation slider is moved to the right of center, the Modulation Sequencer's output is *added* to the value set by the parameter's knob. The further to the right you move the slider, the greater the effect that the Modulation Sequencer has on the parameter—that is, the more it increases that parameter's value. If the modulation slider is moved all the way to the right, the Modulation Sequencer can modulate the parameter across its entire range.

If you move the modulation slider to the left of center, the sequencer's output is *subtracted* from the value set by the parameter's knob. Again, the further that the slider is from the center, the greater the effect the Modulation Sequencer has on the parameter.

Looking again at the screenshot, observe that the **FDBK** parameter is set to 0%. In the absence of the Modulation Sequencer, this would naturally mean that the frequency shifter has no signal feedback. However, the **FDBK** modulation slider is set all the way to the right. This means that the **FDBK** parameter will be increased by the output of the Modulation Sequencer. Since the sliders in the Modulation Sequencer are set from about a fifth of the way up to about two-thirds of the way up, the **FDBK** parameter will be varied from about 20% to about 67% as the sequencer advances once with each sixteenth note.

Now look at the **FINE** parameter controls. The knob is set to -4Hz and the modulation slider is set about two-thirds of the way to the left. This means that the **FINE** parameter will be decreased from its initial value of -4Hz by the Modulation Sequencer. The Modulation Sequencer will change the **FINE** parameter less than it's changing the **FDBK** parameter since the **FINE** modulation slider isn't moved all the way to the left.

The Modulation Sequencers and sliders work the same way for all of BigSeq2's effects blocks. Almost all of the parameters in each effects block can be modulated by the Modulation Sequencer. You can now imagine how BigSeq2 is capable of very complex, evolving sonic effects.

MIDI Controllers

The VST version of BigSeq2 responds to MIDI continuous controller messages. You can use hardware MIDI controllers, such as MIDI slider boxes or the knobs found on some MIDI keyboards, to adjust BigSeq2's parameters. You can assign MIDI controllers to the knobs, sliders, and switches in BigSeq2's Effect panels, and to some of the controls in the sequencer panels. You cannot assign MIDI controllers to the Modulation Sequencer sliders or the Gate Sequencer switches, or to the step locks.

BigSeq2 has a simple "MIDI Learn" mode for assigning its controls to MIDI controllers. To assign a control to a MIDI controller:

- First, hold down the SHIFT and CTRL keys on your PC's keyboard, or SHIFT and CMD keys if you're using a Mac, and click once on the control. A white box will be drawn around the control to indicate that it is ready to learn which MIDI controller it will be assigned to.
- Next, move the MIDI controller to send a continuous controller message—turn the knob, press the button, move the slider, whatever is appropriate.
- The white box will disappear. Now the control will move when you manipulate the MIDI controller.

BigSeq2 waits until it has received two consecutive continuous controller messages with the same controller number before it makes an assignment. This filters out extraneous data sent by some MIDI controllers. If you are assigning a button or switch on a MIDI controller, you may have to press or move the switch twice before BigSeq2 recognizes the controller and assigns it to the desired control.

To assign a different MIDI controller to a control, repeat the same procedure using a different controller.

To cancel MIDI Learn mode without assigning a controller, hold down the SHIFT and CTRL keys (SHIFT and CMD keys on a Mac) and click in any empty area in BigSeq2's window (i.e., don't click on another control). The white box will disappear.

To remove a MIDI controller assignment from a control, SHIFT and CTRL keys, (SHIFT and CMD keys on a Mac) click on the control once so that the white box appears, then click again on the same control.

BigSeq2's MIDI controller assignments apply to all presets and instances of BigSeq2, in all host applications that you use. The MIDI assignments are stored in a special file on your hard drive. The contents of this file are

read when BigSeq2 is loaded by your host. If you have two or more instances of BigSeq2 in use at once, any MIDI assignments you make will not be propagated to the other instances until the next time that your host loads the plug-ins.

The AudioUnit version does not provide the same MIDI assignment features as the VST version. Almost all AudioUnit hosts provide their own mechanism for assigning MIDI controllers to parameters, so it would be redundant for us to implement MIDI controller assignments in the plug-in itself. Consult the documentation for your AudioUnit host to learn how to use its MIDI features.

Automation

Many of BigSeq2's parameters can be automated using your host's automation features. The knobs, sliders, and switches in BigSeq2's Effect panels, and some of the controls in the sequencer panels, are available for automation. Because VST places an upper limit on the number of parameters that can be presented by a plug-in, you cannot assign MIDI controllers to the Modulation Sequencer sliders or the Gate Sequencer switches, or to the step locks. (Consider that the sliders, gate switches, and lock switches for just one of BigSeq2's six sequencers would constitute 128 parameters.) Consult your host's documentation for information on how to use these features.

And Finally...

Thanks again for purchasing BigSeq2. We make every effort to ensure your satisfaction with our products, and want you to be happy with your purchase. Please write support@audiodamage.com if you have any questions or comments.