

Discord User's Guide

Audio Damage, Inc.

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Introduction

Thank you for purchasing Discord3, the newest version of Audio Damage's best-selling Discord series of pitch-shifting based effect plug-ins. A pair of three-algorithm pitch shifting blocks combine with a warm, "vintage" style true stereo tempo-synced delay to give you a multi-effect with an extremely broad palette of unique and usable special effects. From subtle ADT and chorusing to mad-house granular destruction and saturated feedback, Discord3 is a sound designer's best friend, and an excellent addition to the Discord family of effects.

What's New in Version 3

If you're familiar with our previous version of Discord, here are the highlights of the new features in version 2:

- **Two new pitch shifting algorithms.** The original Discord algorithm is present as the "Vintage" mode. The "Clean" mode introduces a new, cleaner shifting algorithm with the same control set as the Vintage mode, The Granular is a granular pitch shifting algorithm that allows either smooth shifting or chaotic destruction, depending on the settings. These modes are designated P1, P2, and Gr respectively.
- **Buffer Size control.** The P1 and P2 algorithms introduce a buffer size control for each side that allows user control over the windowing of the algorithms, for fine tuning the shifting effect to the input material, or for special effects.
- **New filter control.** The pair of filters for each delay have been replaced with a single X/Y control for a bandpass filter's width and center frequency, for easy programming and new feedback effects.
- **Completely redesigned user interface.** Discord3 has introduced new controls to the Discord family; rather than knobs, which are poorly suited to fine control on a computer screen, we have introduced a numerical control. Each number in the value can be grabbed and individually adjusted. Furthermore, we have replaced all remaining knobs with sliders, for easier programming on a computer screen.
- **MIDI Learn.** This effect has MIDI Learn like all our products, but we have added it to the AudioUnit as well; if your AudioUnit host allows sending MIDI to an insert effect, Discord3 AU will respond to MIDI Learn just like the VST always has.

System Requirements

To use Discord, you'll need a Steinberg VST-compatible host application which conforms to the VST 2.0 specifications, and a computer capable of running it. For the Audio Unit version of Tattoo, you'll need an application capable of hosting Audio Unit plug-ins, and an Apple computer with an Intel CPU capable of running it.

We support the use of Discord under Microsoft Windows XP, Vista, or Windows 7; and Apple OS X version 10.5 or newer.

Installation

Double-click the Discord 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). You can retrieve your code from your account at the Audio Damage website if you misplace it. Please don't share your code 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, use the included un-installer application.

Operation

Discord is a digital pitch-shifter and delay plug-in. The P1 algorithm, "Vintage," is modeled after a particular vintage unit which is still highly desired for its vocal-doubling abilities and chorusing effects. P2, "Clean," is a more modern shifting algorithm, with a sound that emphasizes bell-like harmonics at more extreme settings. The Gr algorithm, "Granular," provides a very smooth pitch shift within 5 semitones of the original program material, but is easily capable of far more extreme sound-effects style shifting and chaotic behavior than P1 or P2.

The signal path of Discord3 follows the general design of digital pitch-shifting delays of the early 1980s, with the pitch shifters feeding in to the delays, and the delays' feedback paths going back in to the pitch shifters, for accumulating pitch-shifting effects. We've extended the control range of all three pitch-shifting algorithms two octaves beyond their accurate ranges (which are +/- one octave) in order to create special effects. We've also added Buffer Size controls to P1 and P2 to enable fine control over the windowing effect of those two algorithms.

Discord is a true stereo processor. If used in a stereo context (for example, as an insert on a stereo channel in your DAW's mixer), the left and right channels are processed independently with no summing. If you use the plug-in in a mono context, the incoming signal is routed to both the left and right processors and their outputs are added together.

There are independent right and left controls for almost all of the parameters. The controls in the upper half of the window affect the left channel's processing blocks and the controls in the lower half of the window control the right channel's blocks. If you turn on the **LINK L & R** switch, the left and right controls are linked together so that you can adjust both channel parameters simultaneously.



Discord uses numeric controls for many of its parameters. To change their value, simply click on them with the mouse and drag upwards or downwards. The numeric controls notice where you click on them, and change only the digit that you clicked. For example, if you click on the 2 in the control shown here and drag upwards, the value will change from 1234 to 1334, 1434, etc. If you click on the 3 and drag downwards, the control will change from 1234 to 1224, 1214, and so on.

The following screen shot shows Discord's user interface. The controls are described in the following paragraphs.



1. Pitch Shift Controls

The mode control at the top left of Discord's window chooses one of three modes of operation for Discord's pitch shifters. These modes are:

- **P1, Vintage:** this mode is a careful reproduction of hardware pitch shifters from yesteryear. P1 is also the pitch shifting algorithm used in previous versions of Discord.
- **P2, Clean:** this mode is similar to P1 but usually produces a cleaner shifted sound than P1, particularly at smaller shifting intervals. At larger intervals it can take on an interesting metallic quality that is useful for special effects.
- **Gr, Granular:** this mode is derived from a signal-processing technique called *granular synthesis*. Granular synthesis involves chopping a sound into short segments, called grains, and playing them back at different rates to vary the perceived pitch of the sound. Discord 3's granular processors are tailored for pitch-shifting applications but can create unusual effects ranging from a subtle tremolo to a pointillist spattering of sound.

The **SHIFT LEFT** and **SHIFT RIGHT** controls change the amount that the pitch of the incoming signal is raised or lowered. The value in the display indicates the amount of pitch shift, expressed in cents or hundredths of a semitone. A positive shift amount increases (or sharpens) the pitch of the signal, while a negative amount decreases (or flattens) it. For example, a shift value of +1200 raises the signal's pitch by one octave, and a value of -700 lowers it a fifth. The **SHIFT** controls have a range of ± 3600 .

When mode P1 or P2 is active, the **BUFFER LEFT** and **BUFFER RIGHT** controls vary the size of the delay buffers used to create the pitch-shifting effect. Changing the buffer size allows you to tailor Discord's shifting process to work well with your source material. Larger buffers will generally create a smoother-sounding pitch shift but may blur the attack transients of drums and other sharp sounds.

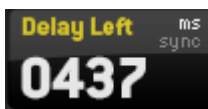
When mode Gr is active, the **DURATION** and **INTERVAL** controls adjust Discord's granular processors. The **DURATION** control sets the length of each sound grain, in milliseconds (thousands of a second). The **INTERVAL** control sets the spacing between the beginning of one grain and the next, also in milliseconds. Each control can have a dramatic influence on Discord's sound. Try adjusting both controls to produce a smooth shifting sound or special effects. If the duration setting is about the same as or less than the interval setting, the grains will no longer overlap and you'll hear them as separate sounds. As you increase the interval the grains will overlap and discord's output will become smoother.

The chaos control applies a variable amount of randomization to the granular process. Click and drag to the right in the area below the word "Chaos" to increase the amount of randomization. The chaos control randomly varies the duration, interval, and pitch of the sound grains. As a side-effect it also creates panning effects since the left and right granular processors are randomized independently.

2. Delay Controls

The **DELAY LEFT** and **DELAY RIGHT** controls change the amount that the pitch-shifted signals are delayed in relation to the original (dry) signal. Each delay has a range of 0 to 1999 msec, or approximately two seconds.

The numeric delay controls operate either in units of time or in metrical units, that is, fractions of a beat. Click on the unit indicators in the upper-right corner of the controls (i.e. the words "ms" and "sync") to switch between the two modes.



If the **SYNC** mode is active, Discord uses the current tempo reported by your host to calculate its delay time. In this mode the delay time control sets the delay length in metrical units. The range of values is $1/32^{\text{nd}}$ to $1/1$ (a whole measure), with dotted and triplet times available. Triplet

values are denoted with a "T" after the beat fraction, and dotted values are denoted with a period. For example, "1/8 ." indicates a delay time with a dotted eighth note feel. Discord will track tempo changes, saving you from having to adjust its delay time by hand when you change the tempo of your song.

Short delay times can enhance a chorusing or doubling effect created with small amounts of pitch shifting. If you set the left and right delay times to slightly different values, Discord will produce a wide stereo chorus. Long delay times create familiar echo effects. In conjunction with pitch shifting and feedback, long delays produce echoes that ascend or descend in pitch.

The **FEEDBACK** slider controls the feedback level, that is, the amount of the output signal which is fed back into the pitch shifter. Note that the feedback path goes through the delay lines and the filters before returning to the pitch shifter. Extreme rising and falling pitch effects can be obtained with longer feedback times when the pitch shift amount is set to a value other than zero. The plug-in will self-oscillate at higher feedback settings, creating interesting noise effects.

The **CROSS FDBK** slider controls a second feedback path. As you move this slider to the right, some of the signal is fed to the input of the other channel. For example, if you move the right-channel **CROSS FDBK** slider, the right channel output signal is fed back into the input of the left channel. This cross-channel feedback can be used to create delay effects that bounce back and forth, thicker chorusing, more complex pitch-shift effects, etc.

If you use the LFO (or automation, or a MIDI controller) to modulate the delay time, you will hear a change in pitch also. This is separate from the pitch change created by the pitch shifter, and an inherent side-effect of dynamically changing the time of a delay. (Delay effects of lesser quality than Discord make nasty clicking sounds rather than altering the pitch of the delayed signal, which is why you may not have noticed that changing delay times affect pitch.)

3. Filter Controls

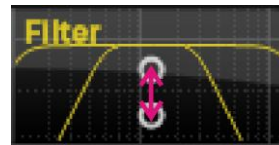
Discord has low-pass and high-pass filters which come after the delay lines in the signal chain. These filters can be adjusted to alter the timbre of the pitch-shifted and delayed signal. For instance, you can use the low-pass filter to create a "darker" sound, or the high-pass filter to create a "thinner" sound.

The filters are controlled in tandem with the graph-like controls labeled, appropriately enough, **FILTER**. Since the filter controls change the low- and high-pass filters simultaneously the filters act like a band-pass filter with a variable width. Dragging the white circle in the control changes the corner frequencies of both filters. Dragging up and down moves the corner frequencies farther apart and closer together; dragging left and right

moves the frequencies in the same direction. As you pull the white dot downwards, the filters move together and allow only a narrow band of frequencies to pass through. You can then move the dot left and right to hear that band move up and down in frequency.



Moving the white dot horizontally changes the filter frequencies in the same direction, moving the frequency pass-band higher and lower



Moving the white dot vertically moves the filter frequencies together and apart, making the frequency pass-band narrower and wider

The behavior of the filters is easier to hear than to describe in words. If you play with the filter controls a little while running a signal with broad frequency content (like a bright synth pad or a drum loop with cymbals) through Discord, you'll hear their effect. It may be helpful to set the **MIX** slider to the far right so that you hear only the processed signal.

4. LFO Controls

Discord has two low-frequency oscillators (LFOs) that can be used to change, or modulate, the amount of pitch shifting, the delay times, and the frequencies of the filters. Hence the LFOs can be used to create vibrato or trill effects by changing the pitch, doubling and chorusing effects by changing the delay time, and tonal changes by changing the filter frequencies.



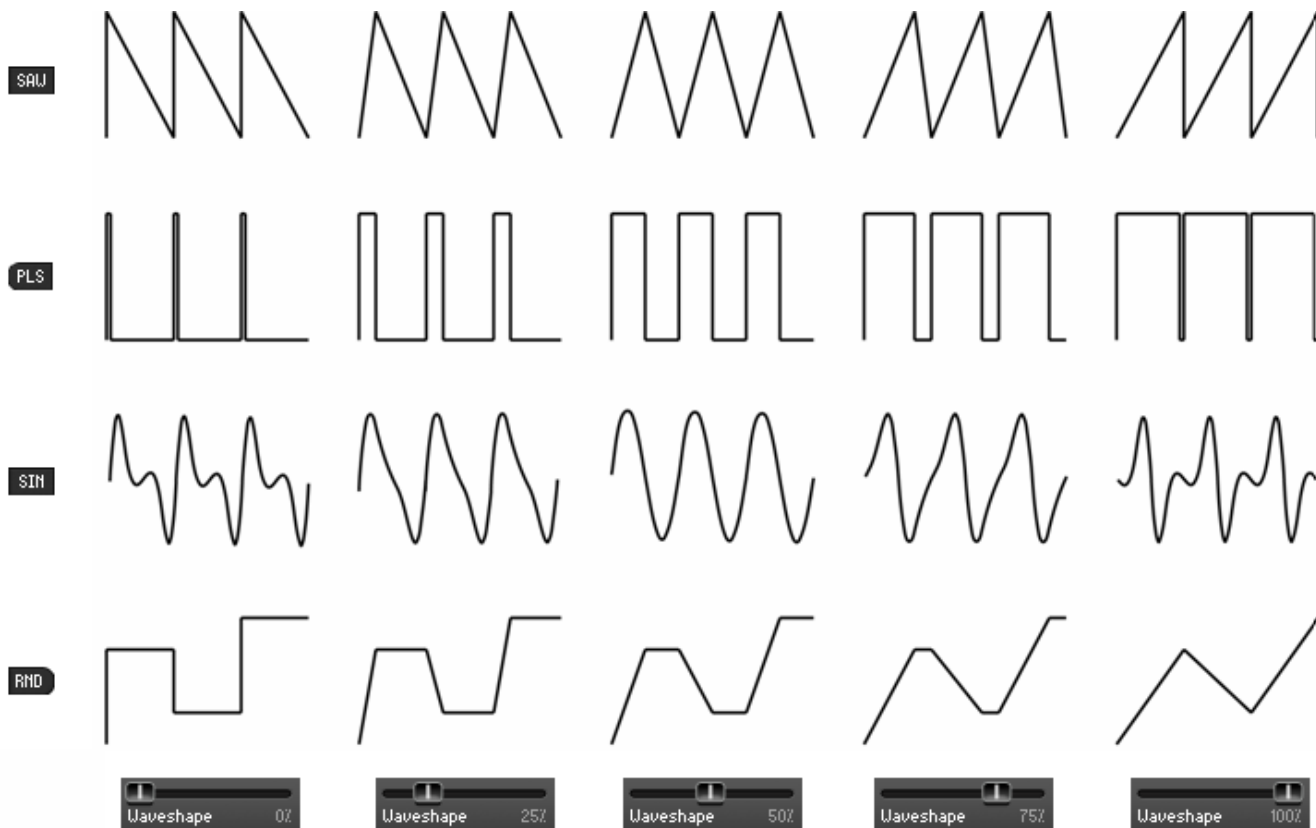
The numeric LFO controls determine how fast the output of the LFO varies over time. They operate either in units of frequency (Hertz, or cycles per second), or in metrical units. The LFO's rate can be set from one cycle every 100 seconds (or 0.01 cycles per second, abbreviated 0.01 Hz) to 14 cycles every second (14 Hz). Click on the unit indicators in the upper-right corner of the controls (i.e. the words "Hz" and "sync") to switch between the two modes.

The **WAVESHAP** slider and **WAVEFORM** buttons work together to control how the LFO's output varies over time. The **WAVEFORM** buttons let you choose one of four waveforms, with sawtooth, pulse, sinusoidal, and

randomly determined shapes. The **WAVESHAPE** slider changes the basic waveform in different ways, depending on which waveform is chosen with the **WAVEFORM** buttons.

- If the sawtooth wave is selected, and the **WAVESHAPE** slider is set to the middle of its range, the output of the LFO rises and falls evenly between its lowest and highest values, creating a symmetric triangular wave. If you move the **WAVESHAPE** slider to the left from its center, the LFO output rises more quickly and falls more slowly. If you move the **WAVESHAPE** slider to the right, the LFO rises more slowly and falls more quickly.
- If the pulse wave is selected, and the **WAVESHAPE** slider is set to the middle of its range, the output of the LFO jumps between its lowest and highest values, staying for an equal period of time at both values. If you move the **WAVESHAPE** slider to the left, the output stays at its highest value for a shorter period of time. If you move the **WAVESHAPE** slider to the right, the output stays at lowest value for a shorter period of time. In engineering terms, the **WAVESHAPE** slider varies the duty cycle of the rectangular wave.
- If the sine wave is selected, and the **WAVESHAPE** slider is set to the middle of its range, the output of the LFO varies smoothly between its lowest and highest values. The difference between a sine wave and a triangle wave is that the triangle wave abruptly changes direction when it reaches its highest and lowest values; whereas the sine wave gradually slows down, stops, and speeds up again when it changes directions. Moving the **WAVESHAPE** slider warps and skews the sine wave without creating any sharp corners in its shape. Its effect is far easier to hear than to describe.
- If the random wave is selected, and the **WAVESHAPE** slider is moved all the way to the left, the output of the LFO jumps to a random value, changing at a rate determined by the numeric control. As you move the **WAVESHAPE** slider to the right, the output moves more slowly from one random value to the next.

The diagram on the next page illustrates the different modulation signals generated by different settings of the **WAVEFORM** and **WAVESHAPE** controls.



Above each LFO are two sliders which control how much the LFOs influence the delays and filters. The **TIME MOD** slider causes the LFO to vary the delay time. Moving the slider to the left causes the LFO to decrease the delay time, moving it to the right causes it to increase the delay time. The **FILTER MOD** slider causes the LFO to vary the frequencies of the filters, as if you were dragging the filter control circle back and forth. Moving the slider to the right causes the LFO to increase the filter frequencies, moving it to the left causes it to decrease the filter frequencies.

Each pitch control also has an associated slider for the LFO which controls how much the LFO changes the amount of pitch shifting. Moving the slider to the left causes the LFO to lower the pitch-shifting interval while moving the slider to the right causes the LFO to raise the pitch-shifting interval.

5. Master Sliders

The **INPUT** slider controls the loudness of the signal entering Discord. Usually you'll leave this slider at its default setting of unity gain (0dB). You may want to decrease the level of the input signal by moving the slider to the left if you hear undesired distortion in Discord's output, particularly if you are using high feedback settings.

The **MIX** slider varies the relative amounts of the original (dry) signal and the processed (wet) signal in the plug-in's output. The **MIX** slider is bidirectional. At its center position equal amounts of the wet and dry signal are sent to the plug-in's output. As you move the slider to the right from the center position, the amount of wet signal is increased and the amount of dry signal is decreased. Moving the slider left from the center has the opposite effect. If you move the slider to the extreme right or left position, the plug-in's output will have only the wet or dry signal, respectively.

The **OUTPUT** slider controls the overall output level (volume) of the plug-in. As you move the slider to the right the output becomes louder. The slider has a range of -80dB, which turns the signal off for all practical purposes, to +3dB, to provide a small amount of boost for weak signals. In most cases you'll probably just leave this slider at its default setting of 0dB, or unity gain, but you can use it to quickly reduce the output level if Discord starts to get carried away with itself.

6. Master Switches

The **LINK L + R** switch, when turned on, links the operation of each left-channel control to its counterpart on the right channel. When you manipulate a control on the left channel the corresponding control on the right channel will move also. Moving controls on the right channel does *not* affect the left channel. For example, you can use the left shift control to set the shift interval of both channels, then use the right shift control to detune the right channel relative to the left. Note that turning this switch on does not immediately change any of the plug-in's parameters, nor does it cause the channels to process audio any differently. You won't lose any of the plug-in's current settings when you turn this switch on or off. In other words, it's not the same as the channel-link control found on some stereo compressors. It merely provides a convenient way to set the parameters of both channels to the same values when you manipulate the left-channel controls.

The **MIDI SHIFT** switch engages or disengages MIDI control of the shift amount. If the **MIDI SHIFT** switch is turned on, the **SHIFT** controls are disengaged and incoming MIDI note and pitch-bend messages set the shift

interval. Pressing a note on your MIDI controller and/or manipulating the pitch bend wheel will set the pitch shifting effect accordingly, enabling you to play the pitch shifter as if it were an instrument. Middle C (MIDI note 60) sets the pitch shifter at zero, or no shifting. The range is three octaves below middle C to three octaves above middle C. The left and right pitch shifters are set to the same interval.

Note: Different hosts have different ways of allowing MIDI information to be routed to effects plug-ins. In some hosts, it is not possible to send MIDI information to effects plug-ins. Consult the documentation for your host if you are unsure about its MIDI routing capabilities.

MIDI Controllers

Discord 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 Discord's parameters.

Discord has a simple "MIDI Learn" mode for assigning its sliders and switches to MIDI controllers. To assign a control to a MIDI controller:

1. Hold down the `SHIFT` and `CTRL` keys on your PC's keyboard, or `SHIFT` and `COMMAND` 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.
2. Move the MIDI controller to send a continuous controller message—turn the knob, press the button, move the slider, whatever is appropriate.
3. The white square will disappear. Now the control will move when you manipulate the MIDI controller.

Discord 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 Discord recognizes the controller and assigns it to the desired knob.

- 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 `COMMAND` keys on a Mac) and click in any empty area in Discord'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.

Discord's MIDI controller assignments apply to all presets and instances of Discord, 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 Discord is loaded by your host. If you have two or more instances of Discord 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.

Automation

All of Discord's parameters can be automated using your host's automation features. Consult your host's documentation for information on how to use these features.

We're On TV!

Well, not really, but we do have a number of tutorial videos available online for your viewing pleasure. Many of the topics described in this manual are demonstrated with video screencasts available in the Support section of our website, <http://www.audiodamage.com>.

And Finally...

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