Dr. Device User's Guide
Audio Damage, Inc.
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Introduction

Thank you for purchasing Dr. Device, Audio Damage's combination filter and delay plug-in. Dr. Device's filter features a warm, resonant four-pole low-pass filter with the overdrive and self-oscillation found in its analog counterparts. The filter section provides several other filter modes as well as an analog-style soft-clipping distortion stage and a very digital-sounding bitcrushing effect. Dr. Device's delay provides a pair of Audio Damage's proprietary delay lines which recreate the unusual characteristics of older hardware delays. The delays offer intuitive controls that produce complex rhythmic effects without the hassle usually associated with setting up multi-tap delay effects.

Dr. Device also features an unusual modulation system for controlling the filter and delay effects. Instead of the same old LFO, Dr. Device has a multi-dimensional, multi-node XYZ pad with a built-in motion recorder and a novel kinetics system, giving the control nodes a life of their own. Dr. Device also offers full support for VST/AU automation and MIDI controllers (VST version only).

System Requirements

To use Dr. Device, 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 AudioUnit version of Dr. Device, 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 10.3.9 or newer
- 512 MB RAM
- Motorola G4/G5 or Intel CPU
- Display capable of "thousands of colors"

Installation

Double-click the Dr. Device 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, use the included un-installer application.

Operation

Dr. Device can be used in a mono, stereo, or mono-to-stereo context. In a stereo context, no summing of the input channels happens; each channel passes through separate filters and delays. Dr. Device is useful as either an insert effect or a send/return effect.

Here is a screenshot of Dr. Device, followed by detailed descriptions of its controls.

1. Filter Controls

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 4PLP (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.

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

- Four-pole low pass (shown as "4PLP" 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 "3PLP"): 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 sound defines entire genres of music.

- Two-pole low pass (shown as "2PLP"): 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 "4PHP"): 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 all of the signal has been filtered out.

- Two-pole high pass (shown as "2PHP"): 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 "4PBP"): 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.

The ***GAIN*** knob amplifies or attenuates the signal as it leaves the filter, changing its loudness. At its center 12 o'clock position it has unity gain, that is, it does not change the signal. Rotate the knob clockwise from this position to make the signal louder, rotate it counter-clockwise to make the signal quieter.

The Soft Saturation (***SOFTSAT***) knob applies a variable amount of analog-like distortion to the signal before it enters the filter. If the knob is rotated fully counter-clockwise it has no effect. As you rotate the knob clockwise, the signal will become increasingly distorted.

The ***BITCRUSH*** knob applies a variable amount of digital distortion to the signal. If the knob is rotated fully counter-clockwise it has no effect. The ***BITCRUSH*** effect works by resampling the signal with a lower sampling rate, deliberately introducing digital artifacts and distortion. Rotate the knob clockwise to create an increasing amount of digital destruction.

The ***ACTIVE*** buttons bypass or engage the filter, soft saturator, and bitcrusher. If the ***IN*** button is illuminated, the filter and distortion effects are turned on. If the ***OUT*** button is illuminated, the filter and distortion effects are bypassed altogether and have no effect on the signal passing through the plug-in. Click either button to switch between ***IN*** and ***OUT***.

2. Delay Controls

The knobs and buttons in the Delay section control Dr. Device's stereo delay effect. The delay receives its input from the Filter section. If you're using Dr. Device in a mono context, the left and right channels of the delay operate on the same input signal.

The **LEFT** and **RIGHT** knobs control the amount of time that the signal is delayed in relation to the original (post-filter) signal. The delay has a maximum time of two seconds. The exact delay times are displayed in the parameter display at the top of the plug-in's window.

The **LEFT** knob controls the delay time of the left channel. It operates in the manner you expect: turn it clockwise to increase the delay time. The **RIGHT** knob is a little unusual. It controls the delay time of the right channel, but operates as a multiplier of the time set by the **LEFT** knob. The **RIGHT** knob provides a selection of simple multiplier values such as 1/2 which makes the right delay time one half of that of the left delay time. The combination of the **LEFT** and **RIGHT** knobs enables you to create interesting rhythmic stereo delay patterns without the complexity associated with setting up multi-tap delay effects.

If you turn on the ***SYNC*** switch Dr. Device uses the current tempo reported by your host to calculate its delay time. When this switch is on, the time knob sets the delay length in metrical units, that is, fractions of a beat. The range of values is $1/32^{nd}$ to 1/1 (a whole measure), with dotted and triplet times available. Watch the status display at the top of Dr. Device's window as you rotate the knob to choose a delay interval—or just do it by ear. 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. Dr. Device will track tempo changes, saving you from having to adjust its delay time by hand when you change the tempo of your song.

The **REGEN** knob, short for regeneration, feeds the delayed signal back into the delays. If the knob is set fully counter-clockwise, none of the signal is fed back and you'll hear only a single delayed copy of the signal in each channel. As you rotate the knob clockwise, more and more of the signal is fed back and you'll hear an increasing number of repeats. If you rotate the knob fully clockwise the delayed signal will repeat indefinitely and become increasingly loud with each repetition. Don't say we didn't warn you.

The **WIDTH** knob controls the stereo separation of the delayed signals. If the **WIDTH** knob is rotated fully clockwise, the outputs of the delays are panned fully to the left and right. As you rotate the knob counter-clockwise, the delayed signals move towards the center of the stereo field. If the knob is fully counter-clockwise, the outputs of both delays are panned to the center.

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

The ***FILTER MODE*** switch chooses between two different tone-control options for the delays. In the ***BBD*** position, the delays include a variable low-pass filter whose frequency depends upon the delay time. As the delay time increases, the filter's frequency decreases, recreating the limited-bandwidth characteristics of analog delays that used "bucket-brigade" delay circuits. In the ***DIGI*** position, the low-pass filter has a fixed, fairly high frequency, providing a gentle amount of high-frequency roll-off which helps the delayed signal mix well with the original.

The ***ACTIVE*** switch connects and disconnects the delays from the signal path. If the ***ACTIVE*** button is set to ***OUT*** the inputs to the delays are muted. Click either button to switch between ***IN*** and ***OUT***.

3. The XYZ Pad

The square region in the center of Dr. Device's window is a two-dimensional control called the XYZ pad. The XYZ pad has two circular handles that can be moved horizontally and vertically when you click and drag them with the mouse. For brevity, and lack of a better term, we refer to the circular handles as nubbies. Borrowing from geometry, the letters X and Y refer to the directions, or axes, that you can move the nubbies. X refers to the horizontal direction or axis, Y refers to the vertical direction/axis. The nubbies also have a third axis called Z, whose value is determined by whether or not the mouse button is clicked when the pointer is over the nubby[1]. Usually you'll use your mouse or other main input device to move the nubbies, but you can also move them with MIDI Continuous Controller messages.

The ***DEST*** buttons (short for Destination) and sliders next to the lower-left and -right corners of the pad let you use the nubbies to control Dr. Device's parameters. The controls on the left are for the light-colored nubby; those on the right are for the dark nubby. (Notice the small images of the nubbies on the Dest buttons.) Each nubby can control up to three parameters at once. You can control only one parameter with each nubby axis, and, conversely, any parameter can be controlled by only one axis.

The range sliders determine the range of values over which movements of the XYZ nubbies change their destination parameters. Each range slider has two moveable handles. The left handle sets the lowest value that the destination parameter will reach when controlled by the XYZ pad. The right handle sets the highest value that the parameter will reach.

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1 Yes, since there are actually three axes of motion, technically we could call Dr. Device's pad a three-dimensional controller. That sounds a little presumptuous, though, doesn't it?

For example, suppose that the X axis of a nubby is assigned to control the filter frequency, the left handle of the X-axis range slider is positioned about ¼ of the way from the left end of the slider, and the right handle is positioned about ¾ of the way from the left end, like this:

Now, when you move the nubby all the way from the left edge of the XYZ pad to the right edge, the filter frequency knob will rotate through about half of its range, from about the 10 o'clock position to about the 2 o'clock position. If the Y axis of the nubby was assigned to the filter resonance, and the range slider handles were positioned as shown above, the resonance knob would rotate from its center 12 o'clock position up to its maximum value as you moved the slider vertically from the bottom to the top of the XYZ pad.

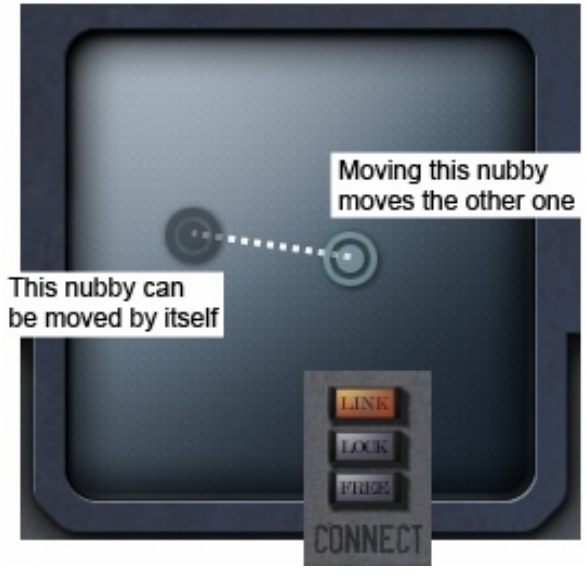
4. Motion Controls

The controls in this section determine the various ways the nubbies can move about, and their relationship with each other. Using the motion controls with the nubbies, you can create fairly sophisticated modulation sources which can then be used to drive the effect in rhythmic ways.

The **CONNECT** buttons hook the two nubbies together. If the nubbies are connected, they move as a unit. Both nubbies still control any parameters assigned to their axes of motion, so you can control up to six parameters at once by moving just one of the nubbies. The **CONNECT** button has three different settings which affect how the nubbies are connected:

With the **FREE** setting, the nubbies are not connected and operate completely independently.

With the ***LOCK*** setting, the nubbies are connected together. Moving either nubby moves the other by the same amount, and clicking either nubby also causes the other nubby's Z-axis value to also change from zero to one. A solid line appears between the nubbies when the ***LOCK*** mode is engaged.



With the ***LINK*** setting, the nubbies are connected together but the dark-colored nubby can be moved independently of the light-colored nubby. Moving the light nubby moves the dark one by the same amount, but moving the dark nubby does not move the light one. Clicking the dark nubby does not cause the light nubby's Z-axis value to change. The ***LINK*** mode lets you change the relative position of the nubbies without disconnecting them. A dotted line appears between the nubbies when the ***LINK*** mode is engaged.

The ***MODE*** buttons control Dr. Device's motion recorder. The motion recorder is a built-in automation mechanism that records and plays back the movements of the nubbies. Dr. Device makes separate recordings for each nubby, so you can first record a series of movements for one nubby and then record another series of movements for the other nubby while the first one moves by itself. You can also have the motion recorder control the movements of one nubby while you move the other with your mouse.

When the ***OFF*** button is illuminated the motion recorder is inactive and doesn't affect the nubbies.

When the ***REC*** button is illuminated the motion recorder is ready to record the movement of the nubbies. When you click on a nubby the recorder will start recording as you move the nubby around. The recording ends when you release the mouse button, and the motion recorder starts playing back the recorded motion. The time it takes for the recorded motion to be played back is controlled by the ***TIME*** knob; see below.

When the ***PLAY*** button is illuminated the motion recorder plays the movements recorded for one or both nubbies. The movements are played back in a looped fashion; as soon as the movement reaches the end of the recording it starts over again at the beginning. The recordings for both nubbies always take the same amount of time to play back, as determined by the ***TIME*** knob described below.

The ***TIME*** knob determines the amount of time it takes for the motion recorder to play back the recorded motion of the nubbies. This time is always synchronized to the current tempo of your host sequencer. The playback duration is displayed in the parameter display at the top of the window, and is expressed as a fraction of a measure. For example, if the display shows 1 / 2 the nubbies will move through their recorded motions twice in each measure. Rotate the ***TIME*** knob clockwise to increase the amount of time it takes to play back the motion recordings, counter-clockwise to decrease the amount of time. The ***TIME*** settings range from 1 / 32 of a measure to 2 measures. Note that the playback duration of the motion recorder is entirely independent of how long you moved the nubby around while making the recording.

Note: Dr. Device’s motion recorder depends upon accurate synchronization information from your host. Not all hosts provide this information (even though it is required by the VST 2.0 specification). If your host does not provide sync info, Dr. Device’s motion recorder will not work.

Motion recordings are stored with Dr. Device's presets. Each preset has one recording for one or both nubbies. To erase the motion recording for a nubby, hold down the CTRL key if you’re using Windows, or the CMD key if you’re using OS X, while clicking on the nubby. To erase the recordings for both nubbies, hold down the CTRL or CMD key while clicking the ***MODE*** switch.

If the **KINETICS** button is turned on, the nubbies move by themselves after you move them with the mouse. If you release the mouse button as you drag a nubby, it will continue to move with the same speed and direction that you dragged it. In other words, you can push the nubbies with the mouse and they'll coast in the direction that you push them. (Think of an Air Hockey table.) The nubbies bounce off the sides of the pad area and will continue to move until you turn the **KINETICS** button off. If the nubbies are connected in either the Link or Lock mode, they'll bounce around the pad together, staying a fixed distance apart. Try it—it makes more sense to see it than to read a description of it.

The kinetics system operates as part of Dr. Device's signal processing. Some hosts turn off plug-ins when audio is not passing through the plug-in to conserve CPU cycles. If your host turns off Dr. Device, the nubbies will cease to move.

If you hold down the CTRL key (for Windows) or the CMD key (for OS X) while clicking the ***KINETICS*** button, the velocities of both nubbies will be set to zero and their motion will cease. This can be handy if you give one of the nubbies a good shove and it bounces around so quickly that you can't catch it with the mouse pointer.

The motion recorder has priority over the kinetics. If you've already recorded the motion of one or more nubbies and set the **MODE** of the motion recorder to **PLAY**, the **KINETICS** button will have no effect on the nubby or nubbies controlled by the motion recorder. However, you can use the motion recorder to control just one of the nubbies, leaving the other to bounce around freely when **KINETICS** is turned on.

5. Level Controls

The Level knobs let you boost or reduce the level of the signals entering and leaving the plug-in. Both have an operating range of -40dB (nearly silencing the signal) when rotated fully counter-clockwise to +3dB (amplifying the signal by a small amount) when rotated clockwise. In most circumstances you'll probably not need to adjust these controls. The Input knob can be used to reduce the input signal's level if you find that it seems to be overloading the filter, and the Output knob can be used to adjust Dr. Device's overall output loudness.

MIDI Controllers

The VST version of Dr. Device 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 Dr. Device's parameters.

The VST version of Dr. Device 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 square will disappear. Now the control will move when you manipulate the MIDI controller.

Dr. Device 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 Reverence 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 Dr. Device'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.

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

Dr. Device automatically makes three MIDI assignments when instantiated. The X, Y, and Z axes of the light-colored nubby are assigned to MIDI control numbers 12, 13, and 92 respectively. You may find these assignments are useful if you happen to own a popular performance-oriented touchpad device and effects unit.

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

Almost all of Dr. Device's parameters can be automated using your host's automation features. Consult your host's documentation for information on how to use these features.

Dr. Device only transmits parameter-change messages for automation for controls that you move yourself. When you move a nubby or turn a knob with the mouse, automation data for the nubby or knob is transmitted to your host. Automation data is not transmitted when the nubbies move in response to either the Kinetics feature or the motion recorder. Nor is any automation data transmitted for parameters controlled by the nubbies. If you connect a nubby's axis to a parameter and move the nubby with the mouse, automation data for only the nubby will be received by the host; no data will be received for the targeted parameter.

And Finally...

Thanks again for purchasing Dr. Device. 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.