



Mangleverb User's Guide
Audio Damage, Inc.
Release 1.0

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Introduction

Have you ever wondered what would happen when you combine a thick algorithmic reverb, a rough-and-ready vintage-style synth filter, and a healthy dose of modulation? Us, too. As luck would have it, we happen to have a plug-in company, so we put our heads together, hit the woodshed, coded a little, swore a lot, and Mangleverb is the result.

We started with the reverb algorithm from the much-loved but long unavailable Deverb, one of our earliest products. We then put it next to a screaming analog filter model, and hit the whole shebang with a sophisticated LFO and a full-featured envelope follower (with sidechain input, if that's your bag.) The result is a highly capable toolbox for the sonic troublemaker.

System Requirements

To use Mangleverb you'll need a Steinberg VST-compatible host application which conforms to the VST 2.4 specification, and a computer capable of running it. For the Audio Unit version of Mangleverb, 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 Mangleverb under Microsoft Windows XP, Vista, or Windows 7 or 8; and Apple OS X version 10.6 or newer.

Installation

Double-click the Mangleverb 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 registration code from your account on the Audio Damage website if necessary. 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.

On OS X, the installer installs the Audio Unit and VST versions of Mangleverb by default. If you click the Customize button you can choose to not install one or more of these formats. There's no need to install formats that you don't use, but on the other hand they don't take up much space if you do install them. If your host gives you a choice of which format to use, we recommend using the VST version. The OS X versions are combined 32/64-bit binaries.

If you're running a 64-bit version of Windows, you can choose to install either 32- or 64-bit versions of Mangleverb, or both. (There is no reason to install 64-bit plug-ins on a 32-bit version of Windows, and there are good reasons to not do so.)

Operation

Mangleverb consists of three signal-processing sections: a reverb, a filter, and a VCA (“VCA” being an acronym for Voltage-Controlled Amplifier, a module familiar to synthesizer users). The filter and VCA can be controlled by two modulation sources: a low-frequency oscillator (LFO) and an envelope follower. The LFO can be synchronized to the tempo of your host sequencer or run independently. The envelope follower can respond either to the plug-in’s input signal, or several other sources, including MIDI notes. We’ll examine the controls for each of these sections in turn.

Warning: Mangleverb can make very loud noises in an unexpected manner. In particular, turning up either the **Q** or **FEEDBACK** knobs far enough will cause Mangleverb to break into self-oscillation, creating a loud, sustained tone regardless of the input signal. As always, please be careful of your hearing.

Reverb

Starting at the left of Mangleverb’s window, the first group of knobs and switches control the reverb. Mangleverb’s intent is not meticulous emulations of acoustic spaces or anything complicated like that; hence it has a pretty simple set of reverb controls.

At the top we have the **COLOR** knob. This knob changes the overall timbre of the reverb section by applying an equalizer to the reverb’s output. This EQ is a somewhat unusual configuration of filters known as a tilting EQ. Turn the **COLOR** knob to the right and the EQ boosts the highs and cuts the lows, turn it to the left and the opposite happens.

The **DECAY** knob controls how long the reverberation lasts. As you can probably guess, turning the **DECAY** knob up makes the reverb last longer, making a bigger, more spacious sound. Next to the **DECAY** knob lurks a small but powerful button labeled ∞ , which means infinity. If you turn on the ∞ button by clicking it, whatever signal is currently present in the reverb will become frozen there, creating a continuous, infinite wash of sound. Clicking the ∞ button again will return the reverb to its normal operation.

The **MIX** knob mixes some amount of the reverb’s input—the “dry” signal—with its output—the “wet” signal. The mixture is expressed as a percentage of the wet signal. At the knob’s center position, the mixture is 50%, i.e., equal portions of the wet and dry signal. Turn the **MIX** knob to the right to get more of the reverb and less of the input, turn it to the left to reduce the amount of reverb.



The switch labeled **PRE** and **POST** changes the signal path within Mangleverb. If the switch is set to **PRE**, the reverb comes before the filter and VCA. If the switch is set to **POST**, the signal passes through the filter and VCA before entering the reverb.

Filter

Second from the left you'll find Mangleverb's filter controls. Since the cutoff frequency is the most important parameter of a musical filter, these controls are dominated by the large and uniquely decorated **CUTOFF** knob. Turn this knob clockwise to raise the filter's frequency, turn it anti-clockwise to lower the frequency.

The other control which is probably familiar to you is the resonance knob, labeled **Q**¹. Turning up the Q knob will cause the filter to boost signals near the cutoff frequency. If you turn it up far enough, the filter will oscillate, creating a continuous tone and pretty much obliterating whatever input signal you're feeding to it.

The filter operates in one of three different configurations, which you choose with the **TYPE** switch. There are three types available:

- Low-Pass Filter (**LPF**) – the type of filter most commonly found in synthesizers, the low-pass filter attenuates frequencies higher than the cutoff frequency, passing lower frequencies.
- High-Pass Filter (**HPF**) – the high-pass filter does the opposite: it attenuates frequencies lower than the cutoff frequency, passing higher frequencies.
- Band-Pass Filter (**BPF**) – the band-pass filter is like a combination of a low-pass and high-pass filter: it passes frequencies near the cutoff frequency, and attenuates higher and lower frequencies.

Mangleverb's filters are models of the filters found in a much-revered analog synthesizer of yesteryear whose name might have the number 20 in it. Like the originals, they distort signals that pass through them, particularly when driven hard with a loud signal. Since this sort of distortion is often a useful tone-shaping



¹ Why Q? According to Wikipedia, http://en.wikipedia.org/wiki/Q_factor, it originated during early work with inductors (coils of wire used to build filters) and was chosen because all of the other letters in the alphabet were taken for designating other electrical parameters. Yes, really.

tool, we've provided a **DRIVE** knob that boosts the signal before it enters the filter. Turn this knob up and you'll hear the signal become louder and more distorted, in a good way.

The Modulation Source (**MOD SRC**) knobs control how much the filter's frequency is affected (i.e. modulated) by the LFO and envelope follower. Turning these knobs clockwise from their center position will cause the LFO and/or envelope follower to increase the filter's frequency, and turning the knobs anti-clockwise will have the opposite effect. Note that there are combinations of settings in which the modulators have no audible effect. For instance, if you turn the **FREQUENCY** knob all the way up, you won't hear anything if you turn the **MOD SRC** knobs above the 12 o'clock position because the modulators can't raise the filter frequency any higher than its highest setting. On the other hand, if you turn the **MOD SRC** knobs below the 12 o'clock position, you will hear the modulators lowering the filter's frequency.

LFO

Mangleverb sports a low-frequency oscillator (LFO) for generating periodic signals. These signals can control the filter and/or VCA, creating synthesizer-like tonal changes, tremolo and gating effects, etc. The LFO can be locked to the tempo of your host program for creating rhythmic effects that fit with the groove of your music, or can run freely and independently.

The **RATE** knob determines how fast the output of the LFO varies over time. If the **SYNC** switch is not turned on, the LFO's rate can be varied from one cycle every 100 seconds (that is 0.01 cycles per second, abbreviated 0.01 Hz) to 100 cycles every second (100 Hz).

If the **SYNC** switch is turned on, the LFO's rate is determined by the tempo of your music as reported by your host sequencer. A value of 1/1 represents a whole note, a value of 1/8 represents an eighth note, and so on. Dotted notes, which have a duration equal to one and a half times a regular note, are shown with a period in the **RATE** knob's value display. For example "1/4." is displayed to indicate a dotted quarter note, which has a duration of a quarter note plus an eighth note. Triplets, which are groups of three notes that have the same duration as two regular notes, are shown with a T. "1/16T" represents a duration equal to 2/3 that of a sixteenth note.

The **WAVEFORM** switch and **SHAPE** knob together control how the LFO's output varies over time. The **WAVEFORM** switch lets you choose one of four waveforms, with triangular, rectangular, sinusoidal, and



randomly determined shapes. The **SHAPE** knob changes the basic waveform in different ways, depending on which waveform is chosen with the switch.

- If the **SAW** wave is selected, and the **SHAPE** knob 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 rotate the **SHAPE** knob to the left, the LFO output rises more quickly and falls more slowly, creating what is often called a sawtooth wave. If you rotate the **SHAPE** knob to the right, the LFO rises more slowly and falls more quickly, creating what is called a ramp wave.
- If the **PULSE** wave is selected, and the **SHAPE** knob 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 rotate the **SHAPE** knob to the left, the output stays at its highest value for a shorter period of time. If you rotate the **SHAPE** knob to the right, the output stays at lowest value for a shorter period of time. In engineering terms, the **SHAPE** knob varies the duty cycle of the rectangular wave.
- If the **SINE** wave is selected, and the **SHAPE** knob 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 Shape **KNOB** introduces an extra little wiggle in the middle of the sine wave without creating any sharp corners in its shape.
- If the **RANDOM** wave is selected, and the **SHAPE** knob 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 **RATE** knob. As you rotate the **SHAPE** knob to the right, the output moves more slowly from one random value to the next.



These different wave shapes and the effects of the controls upon them are easier to see than to read about, so Mangleverb displays the LFO's output in a pane centered in its controls.



You'll find that the display is most useful at fairly low rates. If the LFO is oscillating above about 5Hz the display can't accurately draw the shape of the LFO. Also, the display operates at a much lower priority than the signal-processing portion of Mangleverb, and hence is at the mercy of your computer's ability and willingness to divide its attention between making music and making pretty pictures. Glitches in the LFO display do not mean that there are audible glitches in the LFO's signal itself.

Envelope Follower

In addition to the LFO, Mangleverb has an envelope follower as a second source of modulation signals. The envelope follower responds to the overall loudness of its input signal and (like the LFO) can be used to control the filter and/or the VCA.

The two knobs labeled **SHAPE** determine how rapidly the envelope follower responds. The **ATTACK** knob adjusts how quickly the envelope follower responds to increases in the incoming signal's level. If the **ATTACK** knob is turned fully anti-clockwise, the envelope follower's output jumps almost instantly in response to increases in the input signal's level. As you turn up the **ATTACK** knob, the envelope follower reacts more slowly to signal-level increases. The Attack knob is useful for making the envelope follower's output smoother when the input signal contains sharp transients, such as drum sounds.

The **DECAY** knob adjusts how quickly the envelope follower's output decreases as the incoming signal's level decreases. If the **DECAY** knob is turned fully anti-clockwise, the envelope follower's output drops almost immediately when the input signal's level decreases. As you turn up the **DECAY** knob, the envelope follower reacts more slowly to signal-level decreases. The **DECAY** knob is useful for stretching the envelope follower's output, making it fade away more slowly than the input signal.

The envelope follower's input can be connected to one of four different sources depending on the setting of its **TRIGGER** switch. This switch also affects the **SENSE** knob, so the envelope follower has four somewhat distinct modes of operation depending on the setting of the switch:

- **INPUT** – This is the operational mode you probably expect: the envelope follower receives its input from the plug-in's signal input. You can use this mode to create auto-wah filter effects or mess with the signal's dynamics. The **SENSE** knob acts as a gain control for the signal; turning it up boosts the level of the signal before it enters the envelope follower.
- **MIDI** – In this mode, the envelope follower receives a gate-like signal when Mangleverb receives MIDI notes. This signal turns on when a note-on event arrives, and turns off when the last note-off event arrives. The level of the signal is proportionate to the velocity of the note. What this means is that you can use MIDI notes to open and close Mangleverb's filter and/or VCA, creating gated-reverb effects, sequenced filter changes, and so on.



In the MIDI mode, the **SENSE** knob acts as a threshold control. If the velocity of a note is below the setting of the **SENSE** knob, the note is ignored. If you leave the **SENSE** knob at its full anti-clockwise setting, all notes generate gate signals for the envelope generator. Turning the **SENSE** knob up raises the threshold, blocking notes with low velocities and passing notes with high velocities.

In order for this mode to work, you'll have to route MIDI data to Mangleverb. How exactly you do this depends on your host software so we'll have to leave this part to you to figure out.

- **SIDECHAIN** – In this mode, a signal other than the plug-in's input drives the envelope follower. This other signal can be any other signal present in your host's mixer—another track, a send buss, whatever. Hence you can use the sidechain input to do fun things like open and close the filter with a kick drum, create reverb that blooms between vocal phrases, and so on. The **SENSE** knob acts as a gain control for the signal; turning it up boosts the level of the signal before it enters the envelope follower.

Support for sidechain inputs in plug-ins varies significantly between different host programs. It may take some experimentation with your host to figure out how (or if) it supports auxiliary connections to plug-ins. To cite two popular hosts as examples: In Ableton Live, the sidechain input will appear as a destination on the lower "Audio To" popup menu once you select a track containing Mangleverb with the upper "Audio To" popup menu. In Steinberg Cubase, Mangleverb shows up as an LCR surround-capable plug-in; its Center input is the sidechain input. Hence you can insert it on a LCR surround group track, create a child buss for that track, and route signals to the Center child buss to feed the sidechain input.

- **LFO** – The LFO mode sends a signal derived from the LFO to the envelope follower. The signal is a pulse wave that's either off or on. If the LFO's output is at half of its maximum value or greater (i.e. above the middle of its display), the signal sent to the envelope follower turns on. If the LFO's output is below the halfway point, the signal turns off. This happens regardless of the setting of the LFO's **WAVEFORM** switch. If you just figured out that the signal sent to the envelope generator will be the same as the LFO's output when the **WAVEFORM** switch is set to **SQUARE**, you get a gold star by your name today. While the envelope follower always receives a square-cornered wave from the LFO, you can use the **ATTACK** and **DECAY** knobs to turn it into something smoother, thus producing a modulation signal that is synchronized with, but different from, the LFO.

The knob labeled **HPF** controls a high-pass filter positioned before the envelope follower's input. Turning this knob up cuts low frequencies from the signal, making the envelope follower respond only to high-frequency portions of the signal. For instance, if the signal is a drum loop, turning up the **HPF** knob will tend to make the

envelope follower respond to the snare and high hats more than the kick drum. This knob has no effect on the **MIDI** and **LFO** modes of the envelope follower.

The envelope follower has a display similar to the LFO to show you what it's doing and what effect the various controls have on its operation.

Master

The Master section has controls for setting the levels of various signals as they pass into, through, and out of the plug in. The **INPUT** knob is a gain control for the input signal. It has a range of -40dB to +6dB and hence can provide a fair amount of attenuation to a modest amount of boost.

The **FEEDBACK** knob is somewhat more interesting. If you turn this knob up, an increasing amount of the plug-in's processed output signal is fed back into its input, mixed with the usual input signal. As you're probably already well aware, feedback in music production can be a good thing or a bad thing². In Mangleverb, feedback can add subtle effects like unusual resonances to the reverb's sound, or not-at-all subtle wailing noises. If you turn the **FEEDBACK** knob up far enough, Mangleverb will cheerfully break into self-oscillation without any input at all. Yes, this means you should be careful about your monitoring levels when you mess with this knob. You may not find that you use this knob all the time, but it's worth giving it a try now and then just to see what happens.



We've mentioned the VCA a few times previously; we finally find some controls for it here in the Master section. The VCA changes the level of the signal after it comes out of the filter. After it passes through the VCA, the signal either continues on to the reverb, or it heads out of the plug-in, depending on the setting of the **PRE/POST** switch in the Reverb section. The **VCA** knob sets the initial gain of the VCA. If you turn it all the way to the left, the VCA has a gain of -50dB, which is to say that not much will get through it. If you turn it all the way to the right, the VCA has unity gain and signals pass through it unchanged.

² For example: if you're singing the national anthem in front of a large audience, feedback is a bad thing. If you're playing the national anthem on an electric guitar in front of a large audience, feedback is a good thing.

The VCA can also be affected by the envelope follower and the LFO, using the **MOD SRC** knobs. These knobs work the same way as their counterparts in the Filter section. Turning these knobs clockwise from their center position will cause the LFO and/or envelope follower to increase the VCA's gain, and turning the knobs anti-clockwise will have the opposite effect. Note that there are combinations of settings in which the modulators have no audible effect. For instance, if you turn the **VCA** knob all the way up, you won't hear anything if you turn the **MOD SRC** knobs above the 12 o'clock position because the modulators can't raise the VCA's gain higher than unity. On the other hand, if you turn the **MOD SRC** knobs below the 12 o'clock position, you will hear the modulators lowering the VCA's gain, creating a ducking or tremolo effect.

The **MIX** knob changes the overall blend between the plug-in's processed signal, also known as the "wet" signal, and the unaltered input signal, the "dry" signal. The mixture is expressed as a percentage of the wet signal. At its center position, 50%, the plug-in's output consists of equal portions of the wet and dry signals. A setting of around 50% is usually what you'll use if you're using the plug-in as an insert effect. If you're using it on a send-return effects bus, you'll probably want to set the **MIX** knob to 100% to obtain only the processed signal.

Finally we have the humble but sometimes useful **EFFECT** switch. If this switch is set to **BYPASS**, sound passes through Mangleverb without alteration. You'll find that Mangleverb is far more interesting when this switch is set to **ACTIVE**. The advantage of the **EFFECT** switch, versus the bypass mechanism that your host software probably offers, is that this switch engages or removes the effect without audible clicks and is easily automated.

Automation

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

And Finally...

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