

# Tattoo User's Guide

Audio Damage, Inc.  
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The screenshot displays the 'Tattoo/2-Tattoo' software interface, which is a percussion synthesizer. The interface is divided into several sections:

- HIGH TOM:** This section contains six knobs for 'Tune', 'Pitch EG', 'Saturation', 'Click Lvl', 'Noise Lvl', and 'Tone Lvl'. It also features two envelope graphs, 'Tone 1 Envelope' and 'Tone 2 Envelope', showing the decay of the instrument's sound over time.
- Mod Sequencer: High Tom Noise Level:** A sequencer for noise level with a 'CLEAR' button and 'RND RST' label. It includes a bar graph and control buttons for 'AUTOFILL', 'INVERT', 'RAMP', 'SINE', and 'RAND'.
- SEQUENCER:** A large grid for sequencing various percussion instruments. The instruments listed are Cowbell, Clap, Rimshot, Cymbal, Open Hat, Closed Hat, High Tom, Mid Tom, Low Tom, Snare 9, Snare 8, and Kickdrum. The grid shows patterns of notes across 32 steps.
- Channel Control:** Includes 'CLEAR', 'RAND', and 'RND RST' buttons, along with 'SELECTED BEATS' and 'RANDOM BEATS' indicators. It also has 'RAND SIZE' and 'RAND VEL' controls.
- Pattern Control:** Features 'CLEAR', 'COPY', and 'PASTE' buttons, a 'STEP SIZE' dropdown set to '2 x 16', and a 'Pattern' indicator.
- Levels:** A row of knobs for volume control for each instrument: KD, S8, S9, LT, MT, HT, CH, OH, CY, RS, CL, and CB. Below each knob are 'Pan' and 'Out' buttons.
- GLOBAL:** Contains 'Play' and 'Stop' buttons, a 'Tempo: 120' knob, a 'SWING' slider, a 'Compressor' knob, an 'ATTACK' slider, and 'Out A' and 'Sequencer' buttons. A 'MIDI Only' button is also present.

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Widget

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# Welcome

Thank you for purchasing Tattoo, Audio Damage's drum synthesizer and sequencer. With twelve voices inspired by the famous XOX series of analog drum machines and an internal sequencer that is second to none, Tattoo makes an excellent addition to the arsenal for any electronic music producer.

Each of the twelve internal voices has been created using our proprietary D-Plane synthesis, and each has been extensively tested and tuned in order to have a broad palette. Every parameter of every voice has its own modulation sequencer, allowing for extensive motion within a pattern.

The grid sequencer in Tattoo is a whole world unto itself, with comprehensive randomization features and multiple sync modes, including a MIDI note sync to enable use with virtually any time signature, groove template, or host swing. The sequencer has MIDI out (VST only) to drive other sound sources, to double or replace Tattoo's internal sounds.

In short, Tattoo is more than a simple drum synth; it is a complete rhythm programming environment, a fantasy come true for any fan of vintage drum machines. We hope you enjoy your purchase, and once you've had a browse around the user interface, please take the time to come back and read this manual to learn how to fully exploit the feature set of Tattoo.

## System Requirements

To use Tattoo, 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 a computer capable of running it.

We support the use of Tattoo under Microsoft Windows XP, Vista, or Windows 7; and Apple OS X version 10.4 or newer.

## Installation

Installation is straightforward: Double-click the Tattoo 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 cool 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/Audio Damage`, and your Audio Units folder, which is located at `/Library/Audio/Plug-Ins/Components/`. To un-install from Windows, delete the plug-in from your VST folder, which is usually at `C:\Program Files\Steinberg\VstPlugins\Audio Damage`.

Note for MacOS X users: you must be logged in to a user account with administration privileges to run the Tattoo installer.

# Overview

Here is a picture of Tattoo's editor window with labels of the sections we'll describe in the following text:



# Pattern Sequencer

The Sequencer section of Tattoo is the answer to Bootsie Collins' immortal question: "where the party at, y'all?" at least in the context of this particular instrument. The Sequencer entire consists of the grid that controls playback of the voices, which we have conveniently named "Sequencer," and the many Mod Sequencers, which modulate the individual parameters of each voice, as well as controlling the velocity of individual events.

The main grid should be a fairly obvious paradigm for anyone remotely familiar with electronic music production, as it is one of the more common ways to create a linear pattern of music. As such, we won't dwell on the basic tenets of grid (or "piano roll") sequencing. Tattoo's grid sequencer is both incredibly simple in operation and quite deep in its feature set, and the following sections deal with its dedicated controls. The Mod Sequencer is joined at the hip with the Sequencer, but has enough features of its own to warrant a separate chapter.

If you're really starting from scratch with grid-based composition: time moves from left to right on the grid. Each horizontal position represents one step in the pattern. Each row represents one instrument; the names of the instruments appear on the left. Click somewhere on the grid and a white square will appear. This means that the instrument in that square's row will play when the sequencer reaches the square's horizontal position. Click the square again to make it go away. You can drag horizontally to turn a number of squares on or off at once.

## ***Pattern Controls***

The pattern controls let you switch between the 16 pattern memories present in Tattoo, copy and paste patterns, and set the step and sequence length of the pattern.

## Selector

The pattern selector is the row of 16 numbers beneath the words "Pattern Control" near the lower center of Tattoo's window. Tattoo can contain up to 16 independent patterns at a time. Clicking the pattern selector chooses the *current pattern*, i.e. the one you hear when Tattoo is playing and the one you can change by clicking notes on and off in the note grid and manipulating the current instrument's Channel Controls.

An orange square is drawn on top of the number of the current pattern. If Tattoo is not playing, the pattern changes immediately when you click on the pattern selector. If Tattoo is playing when you click the pattern selector, Tattoo waits until it reaches the end of the current pattern before switching to the new pattern. This

enables Tattoo to stay in sync with the beat and bar of your music. You'll see a grey square drawn on the pattern selector after you click it, showing you the pattern that Tattoo will next play.

## Clear

The **Clear** button erases all notes in the pattern grid. One click and boom, they're all gone. Use with caution.

## Copy

The **Copy** button makes a copy of the current pattern, including both the contents of the pattern grid and the settings of all of the Channel Controls for all of the instruments. This copy is retained inside Tattoo in a special place that we'll call the copy buffer for lack of a better name.

## Paste

The **Paste** button overwrites the current pattern, including both the contents of the pattern grid and the settings of all of the Channel Controls for all of the instruments, with the contents of the copy buffer. Together the **Copy** and **Paste** buttons let you easily duplicate a pattern and/or move it between any of the 16 pattern memories. Click the **Copy** button to make copy of the current pattern, click a destination pattern on the pattern selector, then click **Paste** to place a copy of the original pattern in the new location. The first pattern is left unchanged.

## Step Size

The **Step Size** popup menu determines both how many steps the current pattern has and the rhythmic value of each step (relative to your host program's sense of time). There are several choices: 1x32, 2x16, 1x16T, 1x16, and 1x8T where 'T' is used to denote triplet values. The choices indicate the length of the pattern and the rhythmic value as shown in this table:

Setting	Step Value	Steps per Pattern
1x32	1/32 <sup>nd</sup>	32
2x16	1/16 <sup>th</sup>	32

1x16T	1/16 <sup>th</sup> triplet	24
1x16	1/16 <sup>th</sup>	16
1x8T	1/8 <sup>th</sup> triplet	12

## ***Channel Controls***

The Channel Controls create random variations for each instrument. Each instrument has its own set of channel controls. Click the name of an instrument in the list on the left of the pattern grid to choose which instrument is affected by the channel controls. The current instrument's name is shown in bright white while the other names are shown in grey.

Channel controls are stored within the pattern memories. When you change patterns the channel controls change also. This lets you create similar patterns with variations created by different settings of the channel controls.

## **Clear**

The **Clear** button erases all of the notes for the current instrument. Of course you can also erase notes by clicking and dragging back and forth in the pattern grid, but the **Clear** button does it all for you with one click.

## **Rand**

Click the **Rand** button to randomly turn notes on and off for the current instrument. Each time you click the **Rand** button, about half of the notes in the current instrument's pattern will be turned on and about half will be turned off.

## **RND RST**

"**RND RST**" is an abbreviation for "randomize on reset". When an instrument's **RND RST** switch is turned on, the instrument's notes are randomized every time Tattoo reaches the beginning of the pattern. **RND RST** creates the same result as if you clicked the Rand button exactly at the beginning of each measure as Tattoo plays.

## Probability Sliders: Selected Beats and Random Beats

The two sliders in the **Channel Control** section labeled **Selected Beats** and **Random Beats** determine the probability or likelihood that Tattoo will play the instrument on any given step. These sliders let Tattoo automatically create random variations of the current pattern.

The **Selected Beats** slider affects notes that you draw in the pattern grid. If the **Selected Beats** slider is set all the way to the right, Tattoo behaves as you expect: it plays every note that you've drawn in the pattern grid. As you move the slider to the left, Tattoo will sometimes refrain from playing notes. The position of the slider determines how likely Tattoo is to play any given note. If you set the slider to its halfway point, Tattoo will play each note that you've drawn in the pattern about half of the time. To put it another way, every time Tattoo plays the pattern you'll hear about half of the notes you've drawn. Which notes Tattoo plays and which it leaves out are determined randomly each time the pattern plays. If you move the slider all the way to the left, Tattoo will omit all of the notes you've drawn for the current instrument.

The **Random Beats** slider adds randomly chosen notes to the pattern for the current instrument. If the slider is set to its leftmost position, Tattoo doesn't add any notes to the ones you've drawn in the grid. As you move the slider to the right, Tattoo will add more and more randomly chosen notes to the pattern. Its choice of notes will change randomly each time the pattern plays.

## RAND SIZE

Which notes Tattoo adds are also determined by the **RAND SIZE** popup menu. The **RAND SIZE** popup menu sets the rhythmic value of the randomly chosen notes. The available values are  $1/32^{\text{nd}}$ ,  $1/16^{\text{th}}$ ,  $1/8^{\text{th}}$ ,  $1/4^{\text{th}}$ ,  $1/2$ , and  $1/16^{\text{th}}$  and  $1/8^{\text{th}}$  triplets. For example if you set the **Random Beats** slider to the middle of its range and the **RAND SIZE** control to  $1/8$ , Tattoo will play eighth notes on the current instrument about half of the time, each time the pattern plays, regardless of any other notes that you have placed in the instrument's row in the pattern grid. If you move the slider all the way to the right, Tattoo will play a steady stream of eighth notes (or whatever rhythmic value you've set with the **RAND SIZE** control).

Note that the **Selected Beats** and **Random Beats** sliders have complementary functions: the **Random Beats** slider causes Tattoo to *add* notes to the pattern while the **Selected Beats** slider causes Tattoo to *remove* notes from the pattern.

## RAND VEL

The **RAND VEL** control, short for “random velocity”, sets the velocity of all notes played in response to the Random Beats slider. Sometimes you’ll want your randomly generated beats to be softer or less noticeable than the beats you’ve entered yourself. Setting the **RAND VEL** control to a low value ensures that all randomly generated notes are played relatively quietly. Of course you can also set **RAND VEL** to a high value and be pummeled with loud, unpredictable drum hits if that’s the effect you’re looking for. Drag up and down on the **RAND VEL** control to change its value.

If you drag all the way downwards on **RAND VEL**, you’ll see that its value changes from numbers to the word SEQ. When set to SEQ, the randomly generated notes use the velocities set in the instrument’s velocity sequencer, i.e. they’ll have the same velocities as the notes you enter in the pattern.

## Output Controls

The output controls comprise a simple mixer for setting the relative loudness of Tattoo’s instruments and their position in the stereo field. Their settings are global, that is, their value is the same across all patterns.

### *Level*

The Level knobs are simple gain controls for each instrument. Click and drag vertically on the knobs to change their value. As the knob rotates clockwise the instrument becomes louder.

### *Pan*

Beneath each Level knob is a panning slider. Click and drag horizontally on the slider to move the instrument’s signal back and forth between the left and right channels of the output bus.

### *Output*

Tattoo has six independent output busses so that you can process its instruments differently within your host application’s mixer. Each output buss is stereo, i.e. it has two channels and the panning controls will behave as you expect. Of course, you’ll have to connect each buss that you use in your host application or you won’t hear instruments that are assigned to a buss other than the first one. Consult your host application’s documentation for setting up a software instrument with multiple output busses; how this is done varies quite a bit from one host to another.

The busses are designated with the letters A through F. A is the plug-in's main output buss and will almost certainly be connected and audible when you load Tattoo into your host application. Click the appropriate letter to switch an instrument's output to another buss.

## Mute & Solo

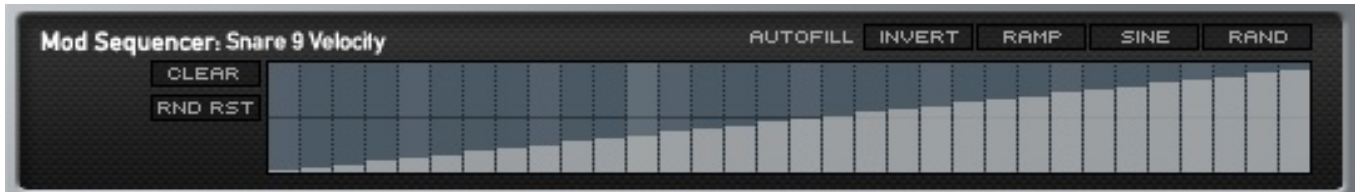
The Mute and Solo buttons, labeled "M" and "S", appear to the left of the instrument names. Click a Mute button to silence an instrument altogether, and click a Solo button to hear only the corresponding instrument. Any number of instruments can be muted at one time but only one can be soloed.

## Mod Sequencer

The Mod Sequencer is Tattoo's hidden (or, okay, not-so-hidden, really) secret. It is actually several dozen sequencers that all share a common interface. There is no modulation routing in Tattoo for the simple reason that there is no need for it. Every single synthesis control parameter has its own sequencer.

The basic idea is this: click on a Voice control of any sort (e.g. "Kickdrum Tune" or "Cowbell Ratio") and the Mod Sequencer switches to show modulation for that control. You can draw any shape by clicking and dragging in the sequence graph, or use one of the provided shapes with the Autofill button. The Mod Sequencer's default view is Velocity, which you see by clicking on the Voice's name to the left of the main sequencer grid.

When the mod sequencer displays velocity values, higher bars mean higher velocities. For all other parameters the mod sequence values are bidirectional, that is, they can either increase or decrease the parameter's value. Here's an example of a mod sequence that increases an instrument's velocity (i.e, loudness) over the pattern:

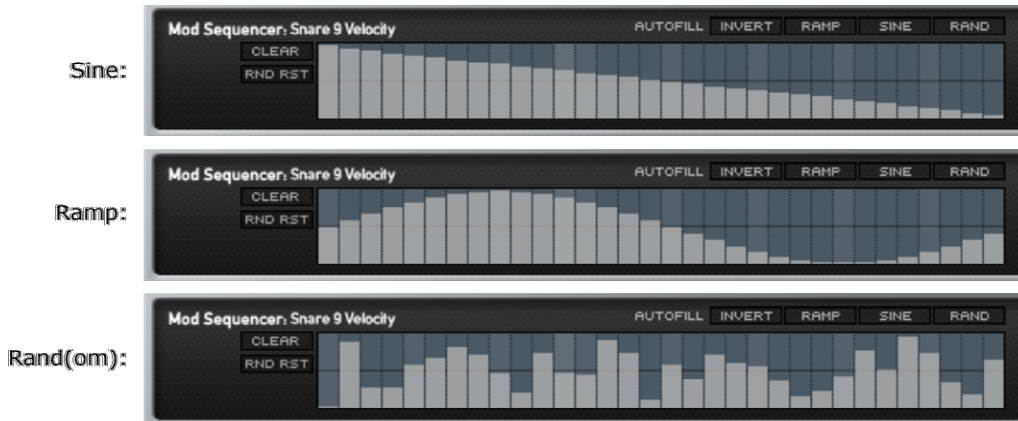


Here's an example of a mod sequence that makes the pitch of a tom rise then fall over the duration of the pattern:



## Autofill Buttons

The Autofill buttons above the mod sequencer graph let you fill the sequence with several preset shapes. Clicking the **RAMP**, **SINE** or **RAND** buttons will produce the following sequence patterns:



Clicking the **INVERT** button reverses the values of each step in the mod sequence: high values become low values and vice-versa. For example, if you click the ramp button and then the invert button, you'll end up with a ramp that slopes upwards from start to finish, rather than downwards as shown above.

## Clear

Clicking the **CLEAR** button sets all of the values in the sequence to their minimum. It effectively erases the sequence altogether.

## ***RND RST***

The **RND RST** (short for “randomize on reset”) switch, when turned on, causes the sequence steps to be set to random values every time Tattoo reaches the beginning of the pattern. **RND RST** creates the same result as if you clicked the **RAND** Autofill button exactly at the beginning of each measure as Tattoo plays.

## **Voice Controls**

All of Tattoo’s sounds are synthesized in real time, not derived from samples. This means that you can tailor the drum sounds to fit your tastes and needs, using the voice parameters found near the top of Tattoo’s window.

The voice parameters are stored globally; that is, they are the same for each of the patterns in Tattoo’s sequencer. (The voice parameters determine the sound of your drum kit; the patterns determine what you play on that kit.) However, you can use the parameter mod sequencers to change Tattoo’s drum sounds in subtle or not-so-subtle ways in each pattern.

## ***Common Parameters***

There are some parameters and controls which all (or nearly all) of Tattoo’s percussion synthesizers have in common. We’ll describe them in general first, and then describe each of the controls for each of Tattoo’s synthesizers.

### **Tune**

Most of Tattoo’s voices have a **Tune** knob. This knob controls the frequency, or perceived pitch, of the percussion sound. Turn the knob clockwise and the sound goes up in pitch, turn it anti-clockwise and the pitch goes down.

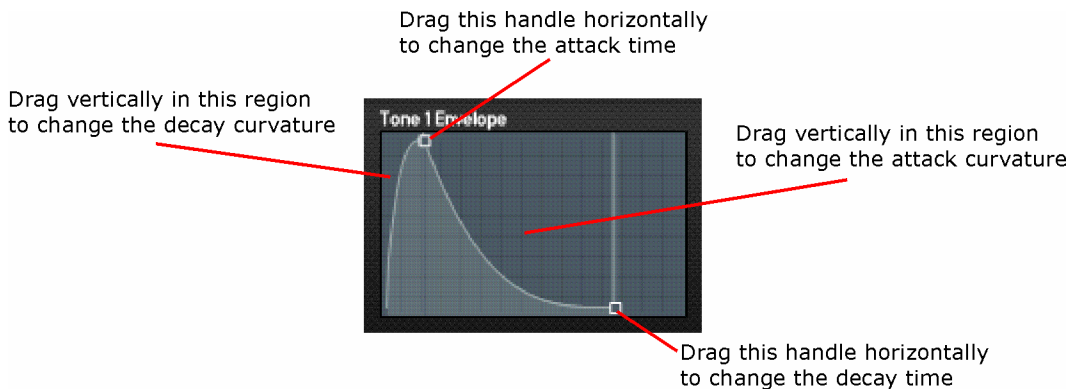
### **Noise Level**

Many of Tattoo’s voices have a noise source. The noise is used in various ways: to add a sharp click to the attack portion of the sound, to simulate the rattle of snares, to add complexity to the sound of cymbals, etc. The **Noise Level** knob controls the loudness of the noise relative to the pitched tone of the sound generator. Turn the knob clockwise to make the noise louder. You can turn the noise off altogether by rotating the knob completely anti-clockwise.

## Envelope Generators

Most of Tattoo's voices have either one or two Envelope Generators (or EGs for short). In a synthesizer, an envelope generator creates a signal that changes in level over the duration of a single note. At least one EG is used to shape the overall loudness of the note, but often at one or more other EGs controls some aspect of the sound's timbre, for example, by controlling the frequency of a filter.

In Tattoo, the envelope generators are quite simple: they have an attack phase, a fixed peak, and a decay phase. You can change the duration of the two phases, and their curvature, by clicking and dragging the envelope with the mouse. Here's an illustration showing how to use Tattoo's EGs:



Since Tattoo is a percussion synthesizer its EGs are naturally tailored for generating percussive sounds. They have a short range of attack times—a few milliseconds at most. The duration and curvature of the attack phase is just enough to soften the initial transient of the drum sound. On the other hand, the decay segment of the EGs is quite long in some instruments, such as the cymbal voice.

### ***Kick Drum***

Tattoo's kick drum was primarily inspired by the kick in the TR-909, arguably the most-used kick drum sound in recent music history. Since the 808's kick is nearly as ubiquitous, we made Tattoo's kick flexible enough to provide accurate emulations of both, as well as any sound in between the two and sounds unlike either.

## Tune

The **Tune** knob controls the pitch of the kick drum's tone. You can tune it down to speaker-threatening near-subsonic lows up to pitches high enough to be a little absurd for this instrument's role.

## Saturation

It's a popular trick to give an electronic drum sound (either sampled or synthesized) a bit more bite by deliberately distorting, or saturating, a pre-amp or mixer's input. Tattoo's **Saturation** knob creates a similar form of distortion. As you rotate the knob clockwise, the kick drum becomes louder and more distorted. If this knob is rotated all the way to its anti-clockwise extreme, no distortion is added to the tone.

## Noise Freq

Tattoo's kick drum includes a noise generator to add a sharp click at the beginning of its sound. The **Noise Freq** knob controls the frequency content of the noise. Turn the knob clockwise and the noise becomes brighter. At the highest settings you'll hear the burst of noise quite distinctly; at more moderate settings the noise blends with the tone of the drum.

## Click Level

The **Click Level** knob controls the loudness of the noise generator described above. You can turn the noise generator off altogether by rotating this knob fully anti-clockwise. The perceived loudness of the noise is also affected by the **Noise Freq** knob, so if you find yourself cranking up the **Click Level** and not hearing any change, try giving the **Noise Freq** knob a nudge.

## Pitch Mod

The **Pitch Mod** (short for "modulation") knob controls how much the Pitch Envelope changes the frequency of the tone. Real drums bend slightly sharp when struck hard enough. Tattoo doesn't particularly aspire to recreate the sound of real drums, but some amount of pitch bend can make the kick drum's sound more prominent. In particular a high setting of the **Pitch Mod** knob combined with a short Pitch Envelope gives the kick a nice attack transient.

## Waveform

The tone generator in the TR-909's kick drum is somewhere in between a sine wave (i.e a pure tone with no harmonic content) and a triangle wave. While building Tattoo we found that a mathematically correct triangle wave was too bright-sounding for a good kick sound, so we ended up creating an accurate reproduction of the output of the TR-909's tone oscillator.

On the other hand, the oscillator in the TR-808 kick is close to a sine wave. That familiar "boooooom" has almost no harmonic content. Hence Tattoo has a switch, labeled **Waveform**, that lets you choose between the wave shape modeled after the TR-909's oscillator and a pure sine wave. Click **9-TRI** for the 909 waveform, and click **SINE** for the 808-style tone.

## Amp Envelope and Pitch Envelope

The kick drum has two envelope generators. One controls the overall amplitude or loudness of the sound, the other controls the pitch of the tone generator. The amount that the pitch changes in response to the pitch EG is controlled by the Pitch Mod knob as described above.

## ***Snare 8***

The Snare 8 voice is modeled directly from the TR-808 snare circuits. We expanded the controls for our version to give it a wider timbral repertoire.

## Tune

The **Tune** knob controls the pitch of the snare's tone generator. Turn it clockwise to make the pitch higher, anti-clockwise to make the pitch lower.

## Noise Color

The **Noise Color** knob controls the filtering of the white-noise generator in the snare synthesizer. Turning the knob clockwise moves the noise higher in the frequency spectrum, making it sound brighter.

## Noise Level

The **Noise Level** knob controls the amount of noise in the snare sound. You can turn the noise all the way off to create a simple, short, electronic-sounding blip from the tone generator.

## Noise Decay

The **Noise Decay** knob controls how long it takes the noise component of the snare sound to fade out to silence. Turn this knob anti-clockwise to shorten the duration of the noise.

## ***Snare 9***

As you probably guessed from its name, Tattoo's Snare 9 voice was derived from the TR-909 snare sound. Our version has much more flexibility; while it can recreate the 909 sound accurately, it can produce a wide range of sounds in its own right.

## Tune

The **Tune** knob controls the pitch of the snare's tone generator. Turn it clockwise to make the pitch higher, anti-clockwise to make the pitch lower.

## Noise Color

The **Noise Color** knob controls the filtering of the white-noise generator in the snare synthesizer. Turning the knob clockwise moves the noise higher in the frequency spectrum, making it sound brighter.

## Noise Level

The **Noise Level** knob controls the amount of noise in the snare sound. You can turn the noise all the way off to create a simple, short, electronic-sounding blip from the tone generator.

## Noise Amp Envelope

The **Noise Amp** Envelope controls the loudness of the noise over the duration of the snare sound. You can lengthen the noise envelope to make the noise dominate the snare's sound, shorten it so that the noise is present only in the initial attack of the sound, etc.

The overall loudness of the noise is also controlled by the Noise Level knob, as described above.

## Tone Amp Envelope

The **Tone Amp** Envelope controls the loudness of the tone oscillators over the duration of the snare sound. Since you can control the noise and tone amplitude envelopes independently, you can create snare sounds that range from the somewhat realistic to the entirely electronic.

## ***Toms (Low, Mid, High)***

Rather than copying any particular drum machine's tom sounds directly, Tattoo's tom voices are an Audio Damage original. The three tom voices have the same sound-generating architecture and differ only in their pitch ranges. Each has a pair of oscillators for creating the main body of the sound, one for the main tone of the drum and one for the prominent third harmonic present in drum sounds. A third oscillator and a noise source are added to strengthen the initial transient of the sound, simulating the click created by the stick hitting the drum head.

## Tune

The **Tune** knob controls the pitch of the tom's tone oscillators. Turn it clockwise to make the pitch higher, anti-clockwise to make the pitch lower. The two oscillators have a fixed frequency ratio so this knob controls both of them.

## Pitch EG

The **Pitch EG** knob controls how much the tom's pitch changes over the duration of its sound. If this knob is rotated fully anti-clockwise, the sound has the same pitch from start to finish. As you turn the knob clockwise, the tone will start at a higher pitch and bend downwards. Small amounts of pitch bend make the initial portion of the tom sound more prominent; large amounts of pitch bend recreate the "pyewwww" electronic tom sounds that fell out of fashion when the disco era ended (probably with good reason).

## Saturation

The **Saturation** knob applies a variable amount of soft-clipping distortion to the tone generators, making the tom sound louder and, uh, more distorted.

## Click Level, Noise Level and Tone Level

These three knobs control the relative loudness of the different parts of the tom's sound-generating components. Turn the knob clockwise to increase the loudness of the corresponding component. By varying the levels of the three components you can create a wide range of electronic percussion sounds. Obviously, if you turn all of them fully anti-clockwise the tom voice won't make any sound at all.

## Tone 1 Envelope and Tone 2 Envelope

The two envelope generators control the loudness of the tom's two tone oscillators over the duration of the sound. Since the two oscillators have different pitches, blending them with different envelopes creates a sound that changes slightly in timbre over time. Since Tone 2 has a lower pitch than Tone 1, a shorter Tone 1 Envelope typically creates a more realistic tom sound. However, realism is probably not why you're using Tattoo in the first place, so feel free to experiment.

## ***Hi Hats (Open, Closed)***

While the TR-606 never achieved the reputation of its larger siblings (at least not yet), it possesses excellent hi hat sounds. Tattoo's hi hat voices were designed after careful examination of both the 606's and the TR-808's hi hats.

Tattoo has separate voices for the open and closed hi hat sounds. Their controls are independent but identical (so yes, your open hat sound can be quite different from the closed hat sound). As usual for drum machines, the closed hi hat voice will cut off (or "choke") the open hi hat voice if they overlap.

## Tune

The **Tune** knob controls the overall pitch of the hi hat sound. Turn the knob clockwise and the sound goes up in pitch.

## Decay

The **Decay** knob controls how long it takes for the hi hat sound to fade out to silence. Turn the knob clockwise to make the sound longer, anti-clockwise to make it shorter. As you would probably expect, the decay time of the open hi hat voice is longer than that of the closed hi hat voice.

## BPF Frequency and HPF Frequency

The hi hat voices employ a pair of filters to control their timbre. The hi hat sound is created by a complex tone generator (modeled directly after circuits found in the TR-606) and a noise generator. The filters, one band-pass filter and one high-pass filter, remove lower frequencies from this combined sound to create a thin, metallic-sounding signal. The **BPF Freq** and **HPF Freq** knobs control the operating frequencies of the two filters. Use the **BPF Freq** knob to change the overall tone of the hi hat; use the **HPF Freq** knob to remove lower frequencies making the sound brighter and thinner.

## Noise Mix

The **Noise Mix** knob controls the relative loudness of the tone generator and noise generator in the hi hat synthesizer. Turn the knob all the way to the left and you'll hear just the tone generator, turn it all the way to the right and you'll hear just the noise generator. If the knob is at its center position the tone and noise generators are mixed equally.

## *Cymbal*

Synthesizing cymbal sounds is something of an uphill battle. Real cymbals produce extremely complex timbres that vary dramatically depending on where you hit them, how hard you hit them, what you hit them with, etc. Apparently displeased with their own efforts, Roland gave up trying to synthesize cymbals and used samples in the TR-909, with debatable results. Strange as it may seem, we at Audio Damage are most fond of the cymbal sound in the lowly Boss DR-110 drum machine, so it and the TR-808's cymbal were the main inspirations for Tattoo's cymbal voice. True to the no-samples-allowed design philosophy, it synthesizes a wide range of metallic timbres.

Tattoo's cymbal has two sound-producing components: a set of oscillators that produce a dense, harmonically rich tone, and a noise source. A controllable amount of white noise is added to create unpitched sound. Two band-pass filters with different center frequencies produce two sound components from this signal. The lower filter produces the bell-like "ding" sound component of the cymbal heard first when it is struck. The higher filter produces the shimmering, high-frequency, sustaining portion of the cymbal sound.

## Tune

The **Tune** knob controls the pitch of the oscillators in the cymbal voice. Turn the knob clockwise and the sound goes up in pitch.

## Noise Level

This knob sets the amount of noise added to the cymbal sound. A small amount of noise makes the voice sound a little less metallic and more complex. A large amount of noise makes the voice sound like an attempt to use the noise source in an analog synthesizer to simulate a cymbal.

## Ding Level

This knob set the relative loudness of the “ding” component of the cymbal voice, that is, the output of the lower-frequency band-pass filter. Changing the loudness of this component shifts the balance between the lower frequencies and the higher frequencies in the overall sound.

## Low BPF

This knob controls the center frequency of the lower-frequency band-pass filter which generates the “ding” component of the cymbal sound. Rotate the knob clockwise to raise the frequency (i.e., raise the pitch), rotate it anti-clockwise to lower the frequency.

## High BPF

This knob controls the center frequency of the higher-frequency band-pass filter which creates the sustaining component of the cymbal sound. Rotate the knob clockwise to raise the frequency (i.e., raise the pitch), rotate it anti-clockwise to lower the frequency.

## Ding Envelope and High Envelope

The two envelope generators control the overall loudness contours of the “ding” portion and the higher-frequency portion of the cymbal sound. Typically you’ll use a shorter envelope for the “ding”, since in most real cymbals it decays more quickly than the sustaining sound, but there’s no reason that you have to stick to this convention.

## ***Rimshot***

Just like the real thing, rimshot sounds in drum machines usually find roles as rhythmic accents. Tattoo's rimshot comes directly from the clever circuits found in the TR-909. It's a simple sound, short but sweet, and hence has a simple complement of controls.

### Tune

The **Tune** knob controls the overall pitch of the rimshot sound. Turn the knob clockwise and the sound goes up in pitch.

### HPF Frequency

Tattoo's rimshot voice employs a high-pass filter to shave off some of the lower frequency components, making the rimshot sound thinner and brighter. Turn this knob clockwise to emphasize the "click" portion of the sound and reduce the body tone.

## ***Clap***

Put your hands together for electronic handclaps, everyone! Roland used more or less the same circuit for claps in all of their early drum machines and Tattoo owes its claps to that circuit. It's a fairly inflexible design in that if you change its parameters much it ceases to sound anything like hand claps, or even what you expect electronic hand claps to sound like. Hence Tattoo's clap voice has only a couple of knobs.

### Tone

The **Tone** knob controls how bright or dark the claps sound. Turn the knob clockwise and the claps become brighter and crisper.

### Reverb

Those clever engineers at Roland came up with an interesting idea: add a little bit of decaying noise to the clap circuit and it sounds a bit like reverb. (Nowadays reverb is cheap and plentiful, but this was certainly not the case when the TR-808 was under development, so people did what they could.) Tattoo's **Reverb** knob

emulates this feature. Turn it up and you'll hear ~~decaying noise~~ simulated reverberation add depth and spaciousness to the clap sound.

## **Cowbell**

Ah, the TR-808 cowbell. Despite the fact that it doesn't sound much like a real cowbell, it has become a staple of dance music rhythm tracks. Tattoo's cowbell voice is a faithful reproduction of the 808 sound that we all know if not love, with a number of additional controls for more sonic flexibility.

### Tune

The **Tune** knob—well, by now you can guess what this does, right?

### Detune

Tattoo's cowbell voice starts with a dense signal generated by several oscillators of different pitches. The **Detune** knob changes the relative tuning of the oscillators, changing the cowbell's overall timbre.

### Filter Cut and Filter Q

The cowbell voice includes a bandpass filter after the oscillators. Turning the **Filter Cut** knob changes the center frequency of this filter, changing the tone of the cowbell. Turning the knob clockwise makes the cowbell sound brighter. The **Filter Q** knob changes the width, or resonance (designated by "Q" in engineering circles) of the filter. Higher settings of the **Filter Q** knob narrow the filter's response, emphasizing the electronic nature of synthesized cowbell sounds.

### Amp Envelope

The amplitude envelope controls the cowbell's overall loudness. Cowbell sounds typically have a short and rapid decay, but you can lengthen Tattoo's cowbell sound if you want it to really explore the studio space.

### More

If you have a fever, and the only prescription is more cowbell, this is your button.

# Global Controls

The global controls, found at the lower-right corner of Tattoo's window, affect Tattoo's overall operation. Most of them will be familiar if you've used a drum machine before, and their utility is pretty obvious even if you haven't used a drum machine.

## Sync

The small popup menu labeled **Sync** lets you choose one of three operating modes for Tattoo. These modes are Host, Internal, and MIDI Note.

The **Host** sync mode locks Tattoo's sequencer to your host program's transport. Tattoo's tempo and timing will be entirely determined by your host program: when you start your project playing in the usual manner, Tattoo will start also; when you stop your DAW, Tattoo stops. Tattoo's sequencers will always be aligned with the bar lines in your host program. In Host sync mode, Tattoo's Tempo knob will have no effect since the tempo is set by the host. Also, the Play and Stop buttons don't do anything in Host sync mode.

The **Internal** sync mode lets Tattoo run independently of the host program. Tattoo will play at whatever tempo you set with the Tempo knob, and will start and stop when you click the Play and Stop buttons. The Internal sync mode is useful if you're using Tattoo in a context in which you have no need for another frame of rhythmic reference, such as running it within Plogue Bidule.

Tattoo's **MIDI Note Sync** mode is somewhat tricky to get the hang of, but its usefulness will be immediately apparent once you understand what it does. In short, the MIDI Note mode lets you use MIDI note messages to make Tattoo's sequencers step forwards and backwards.

When Tattoo is in this mode, the sequencer steps forward one step and plays that step every time it receives a C5 note. If it receives a B5 note, it steps backwards one step and plays that step. If it receives a D5, it goes to step one and plays that step. If it is on step 32, and it receives a C5, it wraps around to the other side and plays step 1. If it is on step 1, and it receives a B5, it wraps around and plays step 32.

In this manner, you have full control over the time base the sequencer is operating at. The main usefulness is to drive a 16-step pattern using a groove template or your host's swing settings. To do that, follow these steps:

1. Create a 1-measure MIDI clip in Tattoo's MIDI channel.
2. In your host's piano roll editor, put a D5 note at 1/16. At 2/16 onwards put a C5.

3. Quantize this clip as desired, or apply a groove template to it.
4. Put Tattoo in "MIDI Note Sync." Tattoo will now follow along with the host's groove or swing.

The one caveat to using this mode is that you do not get random notes smaller than the step size. Also, the internal swing of Tattoo has no effect.

Using the steps above, but varying the placement of C5 notes, will enable you to drive Tattoo in virtually any time signature, as long as your smallest division is less than 32 steps. Want to recreate the 5/8 section of *Tarkus*? No problem. Just follow the steps above, but make one D5 followed by 9 C5 notes, and you've got Tattoo stepping in 10/16 time, easy as that.

## ***Play/Stop***

The large, inviting **Play** and **Stop** buttons mostly do what you expect: click **Play** and Tattoo starts playing, click **Stop** and Tattoo stops. The manner in which they will not meet your expectations is that they function only when Tattoo's Sync control is set to Internal, i.e. when Tattoo is running independently of your host program's transport.

The **Play** button has an extra trick. If Tattoo is playing and you click the **Play** button again, the sequencer will jump back from its current position to the first step.

## ***Tempo***

The tempo knob sets the tempo at which Tattoo plays when it is in Internal sync mode. When the Host sync mode is active, this knob has no effect on Tattoo's operation but the current tempo of your host program's transport is displayed above it.

## ***Swing***

What is generally referred to as "Swing" in drum machines is something of a misnomer, but we'll set aside the semantics of the word for now, and just say that our swing slider does the same thing as the swing control in a TR-909. It moves every even-numbered 16th note to the right, or "behind the beat," resulting in a rhythmically pleasing groove that will theoretically set heads to bobbing, toes to tapping, and asses to shaking.

The swing control in Tattoo is derived directly from the swing of the TR-909. If you have experience with a 909, you'll know that there are 7 distinct swing settings in that storied machine. We've taken all of them and interpolated between them, resulting in a continuous controller. The left-most position is no swing at all, or setting 1 on the TR-909, and the right-most position is full swing, or setting 7 on the TR-909.

This control, since it is intrinsically tied to the movement of 16th notes, only works as advertised when the STEP SIZE is set to 1x16 or 2x16. It has an effect in the other settings, but you'll need to experiment to see if it suits your needs.

Finally, note that every DAW has a somewhat different idea of what constitutes "swing." Since it is something of an amorphous concept in the first place, this is an acceptable situation. However, the swing in Tattoo might not "sit" exactly with the swing in your host. If this turns out to be the case, you can either make a groove template from an audio recording of Tattoo doing 16th note high-hats and sequence everything else against that, or drive Tattoo with MIDI Note Sync, so that it is swinging/grooving the same as your host.

## ***Compressor***

Tattoo possesses a stereo compressor on its main output buss (buss A). This compressor is optimized for drum sounds, appropriately enough, and has just two simple controls for making your drums louder and your beats fatter.

The knob labeled **Compressor** sets the overall amount of compression applied to Tattoo's output, changing several internal parameters at once. If you leave the knob turned fully anti-clockwise the compressor has no perceptible effect on the sound. As you rotate the knob clockwise Tattoo's sounds will become louder and fuller.

The **Attack** slider changes how quickly the compressor responds to the signals passing through it. Like most digital compressors, Tattoo's compressor can respond nearly instantaneously to the sharp transients of synthesized drum sounds. At high compression settings (i.e. when you crank up the Compressor knob) this

response can be too fast since the compressor flattens out all of the sound's shape. By lengthening the attack time, some of the sound's initial transient can pass through the compressor unchanged, letting a heavily compressed sound retain its sharp beginning. As you slide the **Attack** slider to the right, the compressor's attack time becomes longer. At the slider's leftmost position the attack time is extremely short, enabling you to squash Tattoo's sounds nearly flat, should that be the effect you desire.

Note that the compressor is applied only to the main output buss. The other output busses do not pass through the compressor at all.

## ***Out A***

The Out A knob sets the overall loudness of Tattoo's main outputs. It's the master volume knob, in other words. Internally it comes after the compressor, so if you find that turning up the compressor provides a signal that's too loud, use the Out A knob to lower Tattoo's output level.

## ***MIDI Only***

The **MIDI Only** button beneath the word "Sequencer" turns off Tattoo's voice synthesizers. When this button is turned on, Tattoo transmits MIDI data as usual but does not generate any sound itself. Tattoo's sequencer consumes very little CPU power. If you're using Tattoo to control other instruments, either hardware or software instruments, you can turn on the **MIDI Only** button to free up some of your CPU's attention to be used elsewhere.

## **MIDI Controllers**

Tattoo 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 Tattoo's parameters. Most of the controls in Tattoo's user interface can be manipulated with a MIDI controller.

Tattoo has a simple "MIDI Learn" mode for assigning its parameters to MIDI controllers. To assign a parameter to a MIDI controller:

1. Hold down the SHIFT and CTRL keys (SHIFT and COMMAND keys on a Mac) on your computer's keyboard, and click once on the parameter's control. A blue 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 blue square will disappear. Now Tattoo’s control will move when you manipulate the MIDI controller.

Tattoo 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 Tattoo recognizes the controller and assigns it to the desired parameter.

- To assign a different MIDI controller to a control, repeat the same procedure.
- 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 Tattoo’s window (i.e., don’t click on another control).
- To remove a MIDI controller assignment from a control, SHIFT and CTRL keys, (SHIFT and COMMAND keys on a Mac) click on the control once so that the orange box appears, then click again on the same control.

Tattoo’s MIDI controller assignments apply to all presets and instances of Tattoo, 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 Tattoo is loaded by your host. If you have two or more instances of Tattoo 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 Audio Unit version of Tattoo does not provide the same MIDI assignment features as the VST version. Almost all Audio Unit hosts provide their own mechanism for assigning MIDI controllers to parameters, so it would be redundant to implement MIDI controller assignments in the plug-in itself. Consult the documentation for your Audio Unit host to learn how to use its MIDI features.

## **MIDI Notes, In and Out**

Tattoo responds to incoming MIDI note messages and hence can be used as a software synthesizer plug-in. Tattoo’s instruments are assigned to fixed MIDI note numbers, following the usual mapping convention. The assignments are as follows:

<b>Instrument</b>	<b>MIDI Note Assignment</b>
Kick	C2
Snare 8	D2
Snare 9	E2
Low Tom	F2
Mid Tom	G2
High Tom	A2
Closed Hi Hat	F#2
Open Hi Hat	A#2
Cymbal	C#3
Rimshot	C#2
Clap	D#2
Cowbell	D#3

Since Tattoo is a percussion synthesizer, the duration of incoming MIDI notes are irrelevant and Note Off messages are essentially ignored.

You can also use MIDI note messages to select Tattoo's active pattern. When Tattoo receives a note message in the range C4 through D#5 it will switch to the corresponding pattern. C4 switches Tattoo's sequencer to pattern 1, C#4 switches it to pattern 2, and so on. As usual for the Pattern Control, Tattoo changes patterns when it reaches the end of the current pattern.

The VST version of Tattoo also transmits MIDI note data as it plays, using the same note-number assignments as shown above. It transmits velocity values as set in each instrument's velocity sequencer. The Audio Unit

version does not include this feature since OS X currently lacks the ability to transmit MIDI information from Audio Units.

## **Automation**

Most of Tattoo's controls can be automated using your host's automation features. The contents of the main sequencer grid and the mod sequencers cannot be changed with automation data, but just about every other individual control will transmit and receive automation data. Consult your host's documentation for information on how to use these features. Note that Tattoo has over 260 parameters available for automation. Some hosts deal with a parameter list of this length more gracefully than others.

## **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 Tattoo. 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](mailto:info@audiodamage.com) if you have any questions or comments.