

TREMOLATOR™

Rhythmic Amplitude Modulation





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T H A N K S !

First off we'd like to give you a loud THANK YOU for purchasing Tremolator! We know there are an awful lot of plug-ins for you to choose from and we are truly grateful that you have chosen to spend your hard earned scratch (old school for cash) on our product. We take a lot of pride in our work and we sincerely hope that you find Tremolator inspirational and musically useful.

We'd also like to thank all the people that helped in the development of Tremolator and the whole new SoundToys line of plug-ins: Nick Caiano for his super-cool demo sessions and guitar work.

Mikail Graham for letting us hi-jack his wonderful collection of guitar pedals (we'll return them soon we promise!) and for all the help and feedback along the way.

Wendy Letven for her amazing design work on the SoundToys logo, all the SoundToys packaging, and much more.

Andrew Schlesinger for all of his help from the very start of the SoundToys concept from product names, design ideas, and presets, to his witty and useful contributions to this user guide and other sage advice.

Our whole crew of beta testers for Tremolator, especially Arthur Alexander, BT, Jez Colin, Andy Gray, Fab, Lars Fox, Terry Fryer, Peter Freeman, Jon Goldstein, Rich Hilton, Michael James, Pete McCabe, Oliver Momm, Allan Speers, Morgan Page, Michael Costa, Andrew Souter, Willie Wilcox, Doc Wiley, and Richard Zvonar.

-- Ken, Bob, Jamey, Noah, and Mitch



I N T R O (the one that comes before the sequel!)

About Tremolator

Tremolator is number four in our series of totally cool new plug-ins to come out of the SoundToys (formerly Wave Mechanics) plug-in development lab. As with FilterFreak, our analog filtering module, PhaseMistress, our killer analog phase shifter, Crystallizer, our granular echo and pitch shift box, a truly ridiculous amount of programming time, head scratching, listening and tweaking has gone into the development and design of Tremolator in order to provide you with an incredibly creative, powerful, tremolo and amplitude modulation device for your Pro Tools rig.

Tremolator is not your grandmother's tremolo device by any means. Sure, it will do the standard volume wobble that sounds so cool on guitars, but it goes a lot farther than that. Tremolator can create some very ring-mod like sounds when you speed it up into audio range, can create rhythmic amplitude based beats with its built-in and customizable rhythm generator, it has a ton of modulation types and it can do this all in sync with MIDI. And as we always say, there is nothing to break, nothing to ruin and it won't stain your carpet so you might as well just start digging in and playing around to see what this puppy can do.

As with all SoundToys devices we have included a whole bunch of really cool presets (at least we think so) that span the gamut from relatively tame to kind of "out there". So for sure take a little time to go through them with different kinds of input material as it just might create the spark for your next hit record... CD... MP3... DVD... Film... Game... MUSIC! Right!



What and Who is SoundToys Anyway?

If you already own one of our other products like FilterFreak, PhaseMistress or Crystalizer you can skip this section but if not, read on to find out who we are and what we do!

So what the heck is “SoundToys” anyway? SoundToys is a concept, a vision, a new line of totally cool, sonically superior audio FX plug-in devices designed to set a new standard in regards to plug-in processing and sound. And, it’s our new company name.

You see all of us at SoundToys (formerly Wave Mechanics) are a bunch of audio geeks that thirst for new ways to manipulate and mangle sound that are innovative, unique, and with sound quality that is in a class all its own.

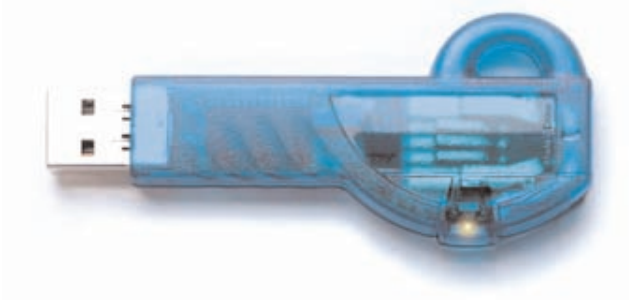
While everyone and their grandmother is modeling older gear these days, we are busy wracking our collective brains to develop NEW devices that are truly inventive and will stand the test of time - the kind of things you’d take with you to a desert island.

Just so you know, we are the guys that were responsible for designing such groundbreaking and industry standard products as the Eventide™ H-3000, DSP-4000, and the Wave Mechanics UltraTools line of plug-ins for Pro Tools TDM. Our DSP algorithms can even be found in such high-end studio gear as the TC Electronics Fireworx, GForce, and G-Major processors, and more.

Our approach in developing the SoundToys series of Pro Tools plug-ins is to create a series of dedicated processors that provide the absolute best possible sound quality, flexibility and creative sound manipulation in the wonderful world of digital, but that also possess that truly analog character and vibe.

System Requirements

Tremolator is a software plug-in for the Digidesign Pro Tools system. You'll need to have at least one decent Macintosh computer (G3 or better. Faster is always better) running OS 9.2 or later and of course you'll need a copy of Pro Tools version 5.0 or later. To use Tremolator you'll also need one of those little "iLok" hardware keys, it's a small blue plastic key that looks like this:



If you don't have an iLok we'll be happy to sell you one at a modest price or you can purchase one from Digidesign or your favorite Pro Tools dealer.

Installing Tremolator

Installing Tremolator is really pretty easy. First, make sure that you have your iLok hardware key connected to your computer, and that you have the Tremolator license card handy. Once you're ready, simply pop the Tremolator CD into your computer's CD-ROM drive and when the CD icon appears on your screen double-click the Tremolator installer program to start the process.

Follow any instructions included in the installer and at the end of the installation process you will be prompted to 'authorize' Tremolator. To do this, carefully detach the license chip from the license card, and insert the chip into the slot in the rear of your iLok when prompted to do so by the installation program.

Once installed, a copy of the Tremolator plug-in will be located in your Digidesign plug-ins folder along with a cool set of Tremolator presets. Finally, a SoundToys folder will be created in your Applications folder. Please note that if you already have FilterFreak, our totally cool analog filter box, this folder will already be on your hard drive and Tremolator will be placed there. The SoundToys folder contains this manual, as well as other useful documentation and tools that you can read or ignore depending on your level of patience or interest in reading babbling things like this manual.



Registration

Please register your product by going to <http://www.soundtoys.com/register>

If you choose not to register your product during the Tremolator installation, please take a moment to register Tremolator by going to <http://www.soundtoys.com/register>. We also strongly recommend that you go to <http://www.iLok.com>, set up an iLok.com account, and register your Tremolator authorization.

So, why should you bother with all this tedious registration stuff? When the day comes that your pet boa constrictor swallows your iLok in the middle of a recording session, and you NEED to use Tremolator, we will be able to get you up and running again MUCH MORE QUICKLY. If you haven't taken the time to do this, we will still try to help you, but we'll have no easy way of knowing whether you are really you, or some bozo that swiped your copy of Tremolator when you weren't looking.



Some Information on Amplitude Modulation...

Tremolo is really nothing more than amplitude (volume) modulation. On a standard guitar amp this is usually just a knob that says, you guessed it, "Tremolo". Usually this has a fixed speed and you can simply adjust the depth. But in its basic form all tremolo is the same: the volume goes up and down, up and down, at some predetermined rate.

The thing that is cool about amplitude modulation is that it can be used in creative ways to really alter the dynamic character of a sound. You can create syncopated beat like effects, volume wiggles, slow floating waves, fast ripples and some very cool dynamic changing effects based on the dynamics of the input signal. Lastly, at really fast speeds, amplitude modulation sounds a lot like a ring modulator creating clangorous, "side band" effects that can be ultra neat and groovy sounding. I think we may have been watching too many late night "Leave it to Beaver" shows...

Anyway, as you can guess, there is a lot you can do with amplitude modulation and Tremolator is just the tool to allow you to get all these cool effects. It's the best damn Tremolo box you'll find this side of...this side of...well, lets just say it's the best damn tremolo unit this side of anywhere...period!



USING TREMOLATOR

Basics

Note: Since you would probably not be reading this unless you own a Pro Tools system we kind of take it for granted that you have at LEAST a basic working knowledge of your computer and of Pro Tools. If you don't, we strongly suggest you make yourself a strong cup of coffee (or two), get a comfortable chair and familiarize yourself with the ins and outs of your Pro Tools system before delving too much further into Tremolator. Digidesign is really nice and provides lots of manuals for your reading pleasure!

Knobs



You can use a mouse to control all of the knobs in Tremolator and they all work in the same way: To turn a knob up, (to the right, clockwise etc), click on the knob with your mouse and drag the cursor to the right or slide the cursor up (towards the ceiling). To turn a knob down, (to the left, counter-clockwise), click on the knob with the mouse and drag the cursor to the left or down (towards the floor). "Mousing" around in a circle doesn't really work; you'll just get frustrated and or dizzy, neither of which is a lot of fun.

Jumping to a Value using Text Markings

Some knobs have text markings showing minimum, maximum, or other values. Clicking on one of these text markings will automatically move the knob directly to that value.


Returning a Knob to its Default Value

To return to the knob's "default value", simply hold down the option key and click on the knob. This will automatically move the knob back to its default value.

Viewing a Knob's Exact Value

To view the exact numerical value of a knob simply hold down the control key and click on the knob. To see the knob's title, hold down control and click on the knob a second time.

Adjusting a Knob with Fine Control

To get finer control over knob values, hold down the apple  key while dragging the mouse.



Toggle Switches



In an effort to provide the feeling of real analog gear our toggle switches “switch” when clicked. To change the “state” of a toggle switch (like the analog/digital control), simply click on the switch. It will change from where it was to the “other” setting. Click again to change it back. Really simple!

LED Displays



LED displays on Tremolator work in a couple of ways:

Nudge Buttons

Most text readouts also include a pair of nudge buttons next to the display. Clicking on the upper button will increase the value by one and clicking once on lower button will decrease the value by one. This is useful for tweaking a value by small steps.

Numerical Readouts & Entering Values from the Keyboard

For numerical readouts, (like BPM), you can enter exact values right from your computer keyboard. Clicking on the LED display highlights the field and makes it “live”. Once highlighted, you can enter a new value via the computer keyboard. Press, “Return” to submit the value and de-select the field. You can also click & drag the cursor to change the value. Simply click on the value and drag the cursor up to increase the value or down to decrease the value, similar to using a knob control. Press, “Return” to submit the new value and de-select the field.



Pop-Up Menus & Changing Values:



For most text-based readouts (meaning things that aren't a number), like LFO WaveShape etc, clicking on the readout with the mouse will display a pop-up menu. To change a value in the pop-up, hold down the mouse button and drag to select the desired value and let go. The selected entry will show up in the field, or a new pop-up window may appear depending on what you have selected.

Accessing Tremolator

Now that you know how to use knobs and pop-up menus, it's time to actually use Tremolator within Pro Tools. Tremolator is available to process your audio in two different ways: Real-Time, or Non Real-time.

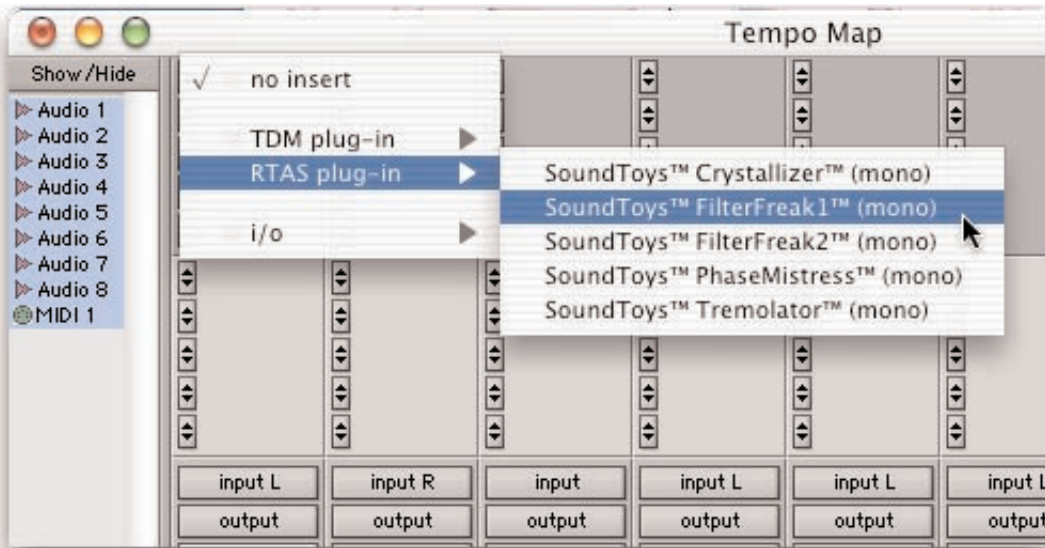
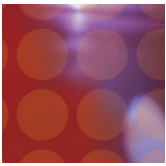
Real Time Processing (RTAS or HTDM)

As a real-time plug-in, Tremolator works a lot like a real hardware...umm...

Tremolator! Whatever sound goes into Tremolator, comes out filtered, and you can hear it as it is happening (in real time!). Keep in mind that using Tremolator in this manner always chews up some CPU processing power.

To use Tremolator in this way, you must first select Tremolator as one of the insert devices within Pro Tools, by clicking on the inserts button on a track. You can do this either from the edit or mix window in Pro Tools. From the inserts pop up, select Tremolator: (one and two-band versions of Tremolator) as shown in the next graphic.

You can insert as many versions of Tremolator as you'd like, just keep in mind that each one gobbles up a certain amount of CPU cycles and can make your computer start to sweat in terms of what's left over for other tasks.

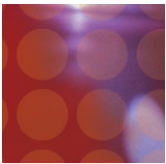


Non-Real Time Processing (AudioSuite)

If you want to save computer power, Tremolator can also be used to process a specific region of audio destructively. This is done in Pro Tools using the AudioSuite version of Tremolator. To do this, first select the region of audio you'd like to process from the Edit window of Pro Tools. Then choose Tremolator from the AudioSuite menu of Pro Tools.

Hit the process button to process the selected region with Tremolator and to write the result back to disk. To hear the effect before committing to disk, click on the preview button.





Using Tremolator Within ProTools

Tremolator is designed to be very integrated with Pro Tools, supporting all of the “standard” Pro Tools plug-in features and controls including parameter automation, MIDI control, etc. Access to these functions can be found in the gray bar that Pro Tools attaches to the top of Tremolator. The display below shows the real-time version of Tremolator. When using the AudioSuite version, an additional gray bar will appear on the bottom with buttons to control previewing and processing.



The Tremolator Preset Library

For your immediate listening pleasure and for those who just can't wait, we've included a bunch of carefully crafted, creative, cool presets with Tremolator. You might want to check these out, as they not only provide a good example of the various types of effects that can be achieved with Tremolator, but one of them just might be the ticket you need for your latest hit record or production. They also provide a great starting point for you to tweak and mangle to your hearts content. Besides, we spent a whole bunch of time making them so you might as well give them a spin.

Loading a Preset:

To view and load a Tremolator preset, simply click on the Settings Librarian button located in the standard Pro Tools plug-in controls area, located at the top of the plug-in window, located in Pro Tools, located on your computer, located in your, oops,





sorry! And as you would expect, for more info on the Pro Tools Settings Librarian', please read the Pro Tools manual.

Saving a Preset

Saving a preset is just as simple. Click on the small button to the left of the preset name and choose "Save" to update the current preset, or "Save As" to create a new preset.

Compare Button

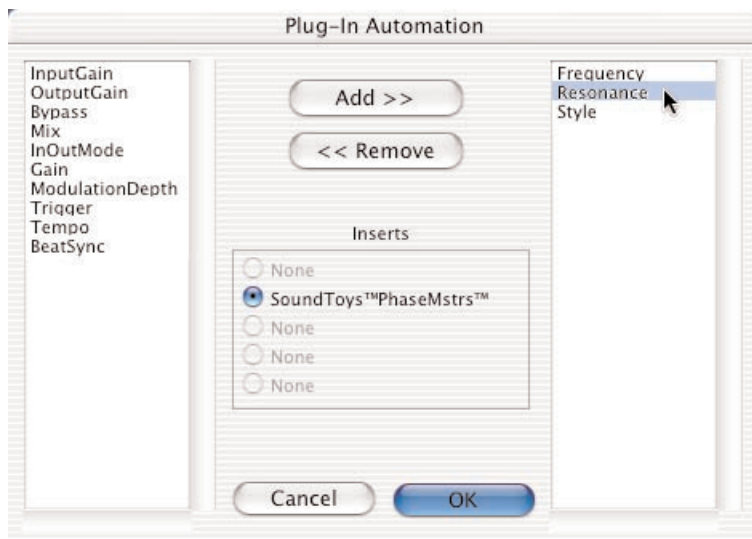
The compare button (often called the compare "light" by Pro Tools pros) is a great way to audition the effect of any changes you've made to one of the Tremolator presets. As soon as you change any parameter in Tremolator, the compare light will come on. Click on the compare light to toggle between the original preset and your current changes.

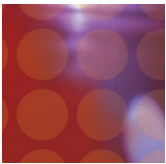
Bypass

One of the more useful features on any plug-in is the Bypass button. Click on this to bypass the effect of Tremolator. This also recovers any CPU cycles being used by Tremolator.

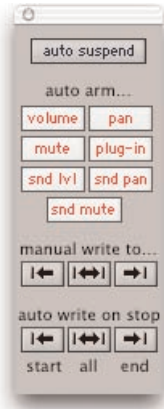
Using Parameter Automation

Many of the controls in Tremolator can be automated. Click on the 'auto' button to bring up the Plug-In Automation window. At the left is a list of parameters available for automation. On the right are any of the parameters that are currently automated. Select whichever parameter or parameters you'd like to automate then click on the 'Add' button. Those parameters will appear on the right side of the window, and can now be automated from within Pro Tools.





To record automation data, you'll first need to do a few things within Pro Tools. First, bring up the Pro Tools automation window (see Pro Tools Manual for enabling automation) and make sure 'plug-in' is enabled. .



Next, in the track you're working on, select 'auto-write' to enable the real-time recording of automation data.

Now, press play and fiddle with the Tremolator controls. Pro Tools should now record any control changes you make. When the transport is stopped, the automation will automatically switch to 'auto-touch'.



Please Note: In auto-touch mode, the automation data you've just recorded will be played back, and any new control changes you make will be written over the older automation data. To prevent these new control changes from being recorded, change the automation mode to 'read'. To turn off all automation on this track, set the mode to 'off'.

It would be really cool to edit these control changes, wouldn't it? Pro Tools has got you covered. From the edit window, click on the waveform button and slide the mouse over until you see Tremolator and its automated parameters. Choose whichever parameter you'd like to edit (it would be nice to see all parameters at once, but for now you've got to work on one at a time.)

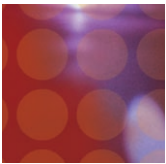


Now you'll see the automation control superimposed on the audio waveform. From this you can click and drag to your hearts content, creating all sorts of wild and crazy effects!

Locking Tremolator to Tempo and Down Beat

One of the coolest features of Tremolator is its ability to synchronize its sweep to the tempo (BPM) and downbeat (the '1' of 1, 2, 3, and 4) in your music. This is a totally awesome way to make Tremolator hip-hop and groove along with your tunes.





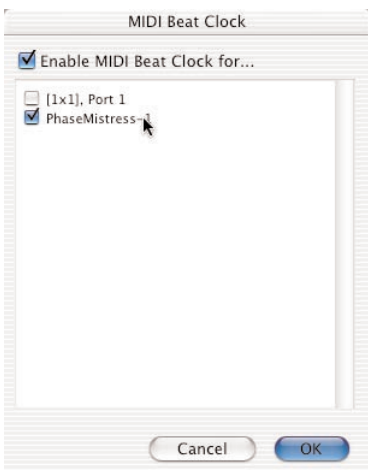
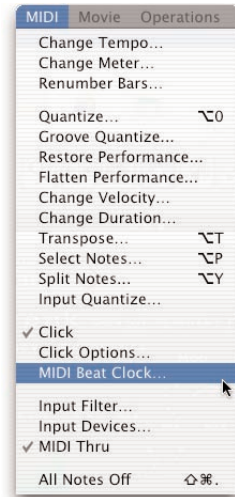
How to Get Tremolator to Sync

Tremolator uses MIDI clock to synchronize with your music.

To sync Tremolator to your tune:

If you are using Pro Tools 6.2 or later simply click on the 'Midi' switch on the front panel of Tremolator. If you are using an earlier version of Pro Tools, you'll also need to do the following:

1. Select 'MIDI Beat Clock' from the Pro Tools MIDI menu.
2. From the dialog box, make sure 'enable MIDI Beat Clock' is checked and that Tremolator (and any other SoundToys plug-in) are also checked. You will need to repeat this step every time you insert a new Tremolator plug-in.

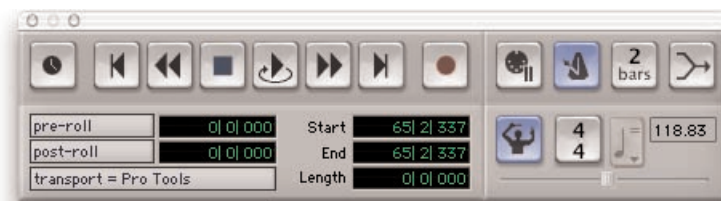


3. Select 'OK' to lock to the Pro Tools tempo and beat clock.

But WAIT! There are still a few things to note before this will all work. New Pro Tools sessions always set the default tempo to 120 BPM, and the downbeat will start at the beginning of the session.

In order for tempo locking to be useful, the downbeats and tempo of your music needs to line up with the downbeats and tempo in your Pro Tools session. If you've recorded everything to a click track within Pro Tools, everything should be cool. If not, you'll need to enable the conductor track within Pro Tools and create a tempo map for your song.

Creating a Tempo Map



Enable the conductor track by clicking on the conductor button in the transport window of Pro Tools. If you don't see the conductor button on the transport window, Select Display->Transport Window Shows from the Pro Tools menu. Make sure MIDI and "Expanded" are both checked.

Create a tempo map by defining bar | beat markers in your song. A simple way to do this is to select the first measure of your song (very precisely) in the Edit window,



and then use the Identify Beat command in Pro Tools (⌘ - I) to define the starting and ending beat numbers for the selection. Pro Tools will then calculate the correct tempo based on this. If the tempo of your music varies (which it probably does if it wasn't recorded to a click), then you may need to repeat this procedure at various points in your song to keep the beat locations lined up correctly.



Hint: It is very, very useful to use a drum track along with the tab to transient feature within Pro Tools to help with this. If you're a Pro Tools TDM user, you may also want to learn about Beat Detective, which can help to automate this potentially tedious process.

More Info: All of this and more are covered in great detail in the Pro Tools manual. For info about tempo maps and conductor tracks look at Chapter 21 of the Pro Tools 6 reference guide. For info about Beat Detective see Chapter 22, and for info about the extremely useful tab to transients feature read Chapter 16, Playing and Selecting Audio.

Using the HTDM version of Tremolator

If you are a Pro Tools TDM user, Tremolator is also available as an HTDM plug-in, and will appear in the TDM inserts menu of Pro Tools. The HTDM version is available because RTAS plug-ins cannot be used on aux tracks and cannot have real-time monitoring when used within Pro Tools TDM systems.

The HTDM format allows native plug-ins like Tremolator to be used just like TDM plug-ins (except that the host CPU is used for processing instead of the DSP chips on the DSP farm cards). One very big caveat here is that the HTDM format causes significant latency (or delay) in the audio stream.



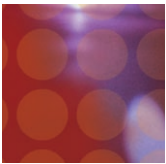
IMPORTANT: Digidesign has a special low-latency version of the 'Stream Manager' driver for Pro Tools. This can reduce the latency from 1024 audio samples to 256 audio samples (from 21 milliseconds to 5 milliseconds at 48 kHz sample rate!) For the latest and greatest info on optimizing HTDM for your system and to download the low latency Stream Manager, please visit the HTDM Q&A page on the Digidesign website. The link to it is:

<http://www.digidesign.com/support/faq/htdm.html>

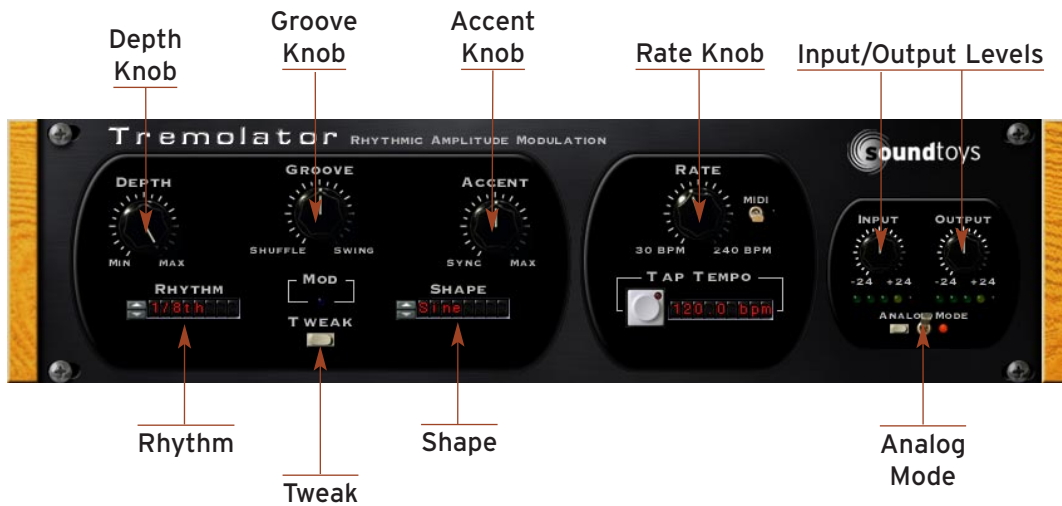
Optimizing CPU Usage

Tremolator is a native plug-in, which means that it uses your computer's processor to do its audio processing. Because of its advanced DSP algorithms, Tremolator can put a pretty heavy load on your processor. Here are some tips to reduce the processing: Set the Digital/Analog switch in the Input section to "Digital". This will save a bunch of CPU cycles as the Analog setting uses a lot more horsepower.

- If you're running multiple tracks through the same effect, use Tremolator on an aux track and use sends to route the audio through Tremolator.
- Commit your effect to disk by using AudioSuite, or, by bouncing to disk



TREMOLATOR CONTROL PANEL



Input and Output Level

The Input and Output level controls are used to (you guessed it) boost or attenuate either the input or output of Tremolator. The default setting of the controls approximates “unity gain” (what goes in comes out the same level) and should provide the best overall “normal” sound quality when set to these levels. The LED’s beneath the Input and Output knobs provide visual display of the input and output signal levels. The yellow LED indicates that the signal is 6dB below clipping. The red LED indicates maximum signal level, and possible clipping which may or may not sound so good depending on the switch setting and what your ears like to hear.

It’s important to note that the input and output level only affects the effected signal and leaves the dry signal unchanged. This approach may be slightly different than that of some other plug-ins and we found this implementation to work best for Tremolator.

Analog Mode Switch (Distortion / Overload Characteristics)

The analog mode toggle switch and flavor button allow you to choose how Tremolator will distort or “saturate” as the signal input increases, which is more noticeable at high signal levels.

Analog Mode

In ‘analog’ mode, Tremolator will saturate in the nice, warm and friendly manner similar to the way real analog gear responds. The analog setting adds a certain amount of distortion at all signal levels. The Analog setting sounds really good but keep in mind the “Analog” setting eats up significantly more DSP resources. Sorry, no free DSP lunch here!



Digital Mode

When the analog mode switch is off, Tremolator is in 'digital' mode. In this mode, higher signal levels will clip in the typically nasty, crunchy digital way. This too can be desirable depending on what effect you're trying to achieve. Lower level sounds are left pretty much unchanged and sound spic-n-span clean. Also note that the digital setting uses significantly less DSP horsepower than the analog setting. (What are horses doing in my computer anyway?)

Needless to say you should experiment with both settings using various types of source material and cranking the input levels up and down to hear what it all sounds like. A fun and educational exercise!

Depth

The "Depth" control defines how deep or how much of the incoming signal's amplitude will be modulated. This can range from a very subtle shift in the amplitude to actual gating of the signal, especially when the modulating waveform has sharp edges like a square wave or saw tooth wave.

There is not right or wrong setting for the Depth control, this is something that you will want to set by ear based on how much of the modulation you wish to impart on the volume of the incoming sound. One thing to keep in mind is that the Depth can be dynamically modulated by the level of the incoming signal using the controls provided under the "Tweak" button. This is covered in depth in the Tweak section.

Groove

Like we said, too many "Leave it to Beaver" episodes. Anyway, the Groove control allows you to impart a 'groove' feel to the tremolo in one of two flavors: Shuffle and Swing. Setting the knob straight up at 12 o'clock is the 'zero' setting and no Shuffle or Swing feel will be imparted on the tremolo pattern.

As you turn the knob counter clockwise towards "Shuffle", an increasing amount of shuffle feel will be added to the tremolo modulation. As you turn the knob clockwise from the center "0" setting an increasing amount of swing feel will be imparted on the tremolo sound. In both cases these 'groove' feels are imparted on the signal regardless of the type of modulation used, the rate, or the rhythm setting.

Accent

As with the Groove knob the Accent knob allows you to add two additional types of rhythmic feels to the tremolo effect: 'Sync' and 'Max'. Again, setting the knob straight up is the null or 'zero' position.



As you turn the Accent knob clockwise, the downbeat of the rhythm pattern will be emphasized, and the other beats will be de-emphasized. As you turn the knob fully clockwise, the '2-3-4' in the beat will be virtually silent with no amplitude modulation happening on those beats. The only pulse in the tremolo effect will be on the '1' or the first downbeat.

This can create some really cool effects not available elsewhere. Keep in mind that if you use a square wave or a rhythmic wave that has very sharp edges, this will give you a gating effect. In any event, using some of the Accent with some of the Groove with a decent amount of Depth all synced up to an incoming midi clock can create a ton of totally cool sounds.

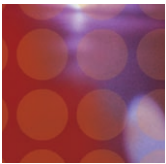
As you turn the knob counterclockwise towards the 'Sync' setting, the 'pulse' of the tremolo on the 'One' downbeat, (in terms of a 1-2-3-4) will become less and less pronounced. When the knob is set fully counter clockwise the 'One' downbeat will be almost fully off. So you'll kind of get a 'drop out' of the signal on the 'One', with tremolo beats still modulating on the '2-3-4'. This too can create some really cool sound especially with various rhythm settings and with the Shuffle and Swing.

Rate

The 'Rate' knob determines the basic rate of the modulation and is set in BPM. The range is from 30Bpm to 250Bpm. It is important to note that the Rate setting determines the downbeat on the 'One', based on a four beat measure. You can further sub-divide the beats based on the "Rhythm" menu setting that we'll cover in a moment. But it is important to note that the Rate knob is setting the 'One' downbeat since what you expect to hear may not be exactly what you get if the Rhythm is not set to the type of division of the beat you want, i.e. quarter note, half note, eight note etc.

Midi Switch

This is pretty simple; when the midi switch is in the down or off position the rate of the tremolo effect is determined by the Rate knob setting. When the Midi switch is in the up or on position the incoming midi clock takes over as the master rate control. You can still subdivide the effect by selecting different note divisions in the Rhythm control but they will all be in sync with midi clock.



Shape

The “Shape” nudge buttons are used to select from the list of available built-in LFO wave shapes. Tremolator includes all “standard” LFO shapes like sine, triangle and square etc, but also includes a method for you to create you own custom wave shapes, which greatly increases the sonic modulation abilities of Tremolator. The number of possible shapes you can create is virtually limitless.



Select the Custom LFO Shape Screen:

To create a custom LFO shape, you first need to get to the LFO Edit screen. Click on the LFO shape LED display to display the shape pop-up menu. Select “Edit” at the top of the pop-up menu. This will launch a screen where you can create custom LFO shapes.





Creating a New LFO Shape / Adding “Points” to the Waveform:

Creating a new shape is really pretty easy. To create a new shape you first need to add a new “point” in the waveform (you’ll notice that the starting shape is a sine wave with three points: one at each end and one in the middle at the top). To add a new “point”, simply click anywhere on the green waveform; this will insert a new point. To remove a point, hold down the option key while clicking on it with the mouse. To change the shape of the wave, click on the new point and drag it up, down sideways etc. You will see that the shape of the green waveform line will change based on where you position the point. Letting go of the mouse will position the point where you left it. You can create as many points on the waveform you like and use the “grab/move” operation to reposition any of the points. This process allows you to create some REALLY complex wave shapes.

Smoothing:

The “Smoothing” control allows you to “round out” the edges in the wave shape between the points. When smoothing is set to zero (no smoothing), the waveform will have a stair-step appearance and will jump abruptly from point to point. By increasing the “Smoothing” control you can decrease the abrupt changes between the points and smooth out the transitions between points by varying amounts. When set to its maximum value the waveform will be completely smooth.

Smoothing Mode:

The Smoothing Mode determines the “shape” of the smoothing that will be used to connect the points. This further increases the variety of waveforms you can create within the LFO Shape Editor. The Smoothing Mode choices are as follows:

Linear: Points are connected using straight lines

Sine: Produces a sinusoidal-like waveform, which is very smooth.

Exp: Produces a “scooped”, curved waveform where the curve is not even but kind of “rises quickly”, similar in shape to those used in an exponential analog ADSR envelope

Sym: Produces a curved shape that is even and symmetrical.

Naming and Saving Custom Waveforms:

Once you have edited a shape and created a new LFO waveform, the Shape LED display will show the word “custom” indicating that a new shape has been created. To keep your wave shape handiwork from going to data-heaven, you need to save it and give it a name. Pressing the Save button allows you to name and save the waveform for future use. Once saved, the new shape will appear in the “Shape” pop-up menu under the Preset menu entry and can be selected as previously described.



Rhythm

The “Rhythm” menu serves a couple of purposes. First off it allows you to determine how you want to subdivide the Rate setting based on all sorts of Bar and Note values. This can range from 1/32 note to up to 4 Bars. So you can get VERY fast modulations as well as v...e...r...y slow modulations based on the value selected and the Rate setting. In addition, you can create custom rhythm patterns using the Rhythm Editor as described below. This allows you to produce complex modulations that can be programmed in musical and rhythmic ways.



Rhythm

You can choose specific rhythmic divisions using the “Rhythm” menu. You can select from one of the included simple rhythms by clicking on the Rhythm LED display, which will launch a pop-up showing the available preset options. Simply highlight the desired rhythmic interval with your mouse and let go. You can also use the two nudge buttons to move through the various rhythm choices.

Custom Rhythm Editor:

In addition to the preset rhythms provided, Tremolator includes a very powerful and unique Custom Rhythm Editor feature that allows you to create your own rhythms. To access the Custom Rhythm Editor, select the Edit option from the Rhythm pop-up menu.

The Rhythm Editor works a bit like a simple drum machine. By default, the basic rhythm pattern is one bar long and is shown in the rhythm display. For each selected event in the rhythm pattern, one entire cycle of the LFO Shape will be triggered and played.



Adding and Deleting Events:

To add an event in a specific location simply click in the rhythm grid at the desired location and a new event will be added to the pattern. To remove an event, just click on the event you wish to remove and it will go bye-bye.

Changing Event Level and Duration:

To change event level or duration, option-click and drag on any existing event. Dragging up/down will change the level, and dragging left/right will change the duration.

Adjusting Grid Length and Spacing:

You can further adjust the grid spacing and length of any new events using the Grid control.

Pattern Length / Number of Beats per Bar:

Increasing the length of a pattern is easy. To create patterns longer than 1 bar simply adjust the Pattern Length control to the desired number. You can also adjust the number of Beats per Bar for the pattern up or down.

Saving A Custom Pattern:

Once you have created a custom pattern it can be stored and named for future recall. After creating your rhythm, the Rhythm LED display will show the word custom. Pressing the Save button will allow you to name and save the pattern. Once saved, the new rhythm will appear in the Shape pop-up menu under the Preset menu entry.

Selecting a Rhythm Preset:

To select a Rhythm Preset, choose the "Preset Menu" option to view the list of available rhythms.



Tweak Button

Pressing the Tweak button will open the Tweak menu screen providing access to a new set of parameters. These controls allow you to alter the rate and depth and provide additional dynamic modulation controls and capabilities based on the volume of the incoming signal.



Keep in mind that underlying these controls is an envelope follower that is “watching” the level of the incoming signal and producing a value based on the changes in the level of this signal. All of the Tweak controls are referenced to the envelope follower signal and allow you to alter the tremolo effect in a variety of dynamic ways.

Threshold

Ok, so we are going a little out of order here but there is a method to this madness. Before we can really discuss the other controls located here, you first need understand how the Threshold knob works as it affects the responsiveness of the other knobs. The Threshold control allows you to define a specific level (as in loudness) that the input must reach before any dynamic processing of the Rate or Depth as set with the other knobs will be implemented. The scale of the Threshold control is in standard ‘dB’.

There are two things to keep in mind. 1) As long as the level of the input signal is above the Threshold level, the modulation of Rate and Depth will be "On" and activated. As soon as the level of the input signal falls below the Threshold setting, the modulation is turned "Off" and de-activated. 2) how “far” the input signal goes above the Threshold setting determines how “deep” the modulation will go (with the maximum available mod depth being defined by the settings of the other knobs.)

So the Threshold really determines how loud the signal must get before any alteration of the Rate and Depth will start and once the signal passes the Threshold setting how much of the modulation will be used. You will see that the white markings around the Threshold knob turn red based on the input signal (kind of like a VU meter), which makes it really easy to see changes in the level of the input signal and set the Threshold accordingly.



Rate Mod

The Rate Mod knob allows you to dynamically increase (or decrease) the rate of the LFO or Rhythm based on the level of the input signal, and the Threshold setting as discussed above. The modulation is either added or subtracted from the basic Rate as set on the front panel. The setting of this knob determines the maximum amount of rate modulation that can occur

The Rate Mod knob is bi-polar; when set straight up it is at the 'zero' position. As you turn the knob clockwise the rate will increase based on the setting of the knob and/or the numbers entered into the LED display below. As you turn the knob counter clockwise the rate will decrease based on the knob setting and/or the numbers in the LED display below the knob.

The Rate Mod scale is in octaves and is based on standard frequency scale; a setting of '1.00' will provide a doubling of the speed (x2), a setting of '2.00' will double the rate again (x4) and so forth. So a setting of '4.00' is equal to a four-octave increase in the rate (x16).

The same approach is used as you turn the knob counter clockwise, except that the rate is decreased (slowed down) as opposed to sped up. One thing that is important to know is that it is possible to increase and modulate the rate to very high speeds (above what is possible with a setting of the fastest BPM + 1/32 note setting) and up into the audio range. This allows you to get 'ring mod' type effects that can be very, very cool. Again, keep in mind that the input signal must pass the Threshold setting to become active and how far above the Threshold setting the signal goes determines how much modulation will be added etc.

It is also important to note that you can still modulate the Rate even if Tremolator is synced to an incoming midi clock. What happens is the rate is driven out of sync and sped up or down but once the mod level drops back to it's 'normal' or base level Tremolator will grab hold again and dance in sync with the incoming midi clock. Cool, no?



Depth Mod

The Depth Mod is also a bi-polar control and allows you to dynamically increase or decrease the depth of the tremolo effect, again, based on the setting of this knob as well as the Threshold setting as previously discussed.

When set straight up the Depth Mod it is at the 'zero' position. As you turn the knob clockwise the depth will increase based the setting of the knob and/or the numbers entered into the LED display below. As you turn the knob counter-clockwise the rate will decrease based on the knob setting and/or the numbers in the LED display below the knob.

You can determine how much you wish to add to the Depth by setting the knob towards the 'Max' setting. The amount of depth that can be added is based on the front panel knob setting. If the front panel Depth is set to its maximum value you obviously cannot add any more depth mod. Therefore, as you increase the Depth Mod amount the basic Depth setting will be 'biased' (scaled back a bit) to allow for the desired increase in modulation to occur. This is a standard practice on most synthesizers and something to keep in mind as you may hear some decrease in the basic Depth setting as you turn this knob up. Again, it all depends on how much Depth Mod you are trying to add and the initial setting of the front panel Depth knob.

Lastly, this behavior may also occur in reverse when you turn the control counter clockwise to dynamically lower the tremolo depth. If there is no Depth set on the front panel it is clearly not possible to take any away, so if the Depth is set to '0' some will be added as you turn the Depth Mod knob counter clockwise.

Attack

To further increase the variations that can be achieved in modulating the Rate or Depth, Tremolator allows not only to adjust how much change will occur but also how quickly or slowly the Rate and Depth will change using the Attack and Release knob settings. Attack is based on time, in milliseconds, with a range from 0ms to 5000ms (5seconds).

Here's how it works. Once the input signal has passed the setting of the Threshold knob, any changes set by Rate Mod and Depth Mod settings are called into play and will change the Rate or Depth accordingly. What the Attack knob allows you to do is to define how long it will take for the Rate Mod or Depth Mod to reach their full modulation depth setting.

At fast Attack settings (knob turned fully counter clockwise) the Rate and Depth Mod will go to their full mod setting instantaneously. As you turn up and increase the Attack time it will take longer for the Rate and Depth modulation to reach their full



amount, or depth of modulation. This lets you create smoother and slower changes in the rate and depth rather than the immediate and abrupt changes that would occur with a very fast Attack setting. As mentioned, this is dependent on the Threshold setting and how far past the Threshold setting the signal goes.

It is important to keep in mind that the attack and sustain characteristics of the input signal will directly affect how you will want to set the Attack time. If the signal is staccato and quickly moves above and below the Threshold it is likely that you will not hear the changes in the Rate or Depth with slow Attack time settings. The input signal will not be above the Threshold setting long enough for the slower attack time to reach its full setting. It is also very important that the sound stay above the Threshold setting for a period equal to the Attack time for the modulation to respond.

Using various Attack times that are either very responsive to, or that are slower than the changes of the input signal level, allows you to create a wide variety of alterations in the tremolo effect. As we keep saying, there are no right or wrong settings. It all depends on what kind of effect you are trying to achieve. Experiment. There are a lot of neat possibilities.

Release

The Release knob works in a similar fashion to the Attack knob but determines how quickly or slowly the Rate or Depth mod will return to their 'normal' settings once the input signal has dropped below the Threshold setting. Release is based on time, in milliseconds, with a range from 0ms to 5000ms (5 seconds).

Again, the way the level of the input signal changes will likely effect how you will want to set the Release time. If you want the modulation changes to track a quickly changing input signal you will likely want to have faster Release (and Attack) times. If you want the depth and rate mod to change more smoothly you can increase the Release (and/or Attack) times accordingly so they are slower than the rate of change in the level of the incoming signal.

Remember that the Threshold setting interacts with and has a direct affect on when the Rate and Depth modulation will begin to occur, how much of the modulation will occur (based on how far above the Threshold setting the signal goes). How the Attack and Release times will be set will most often depend on the type of response you want and how long the signal stays above the threshold setting.



Envelope Mode

The Envelope mode switch affects the way the underlying envelope follower, Threshold, Attack and Release responds and works together. There are two settings: 'Env' and 'Gate'.

When the Envelope Mode Switch is set to 'Env', the Rate and Depth modulation will respond to the level of the input signal. Louder signals will produce more modulation, and quieter signals will produce less modulation. Any input below the threshold will produce no modulation.

When the switch is set to "Gate" the envelope response changes as follows. The amount of Rate or Depth mod is no longer dependent on how far above the Threshold setting the signal goes and instead responds more like an On/Off switch (or Gate). As soon as the input signal goes above the Threshold setting the Rate and /or Depth mod will be driven to its maximum settings (defined by the Rate Mod and Depth Mod knobs) and at the rate determined by the Attack knob.

In the Gate mode the depth will remain at its full value, based on the Rate Mod and Depth Mod knob setting, and will be "pinged" at their full value for as long as the input signal is above the Threshold. This can greatly affect how the rate and depth mod respond and it can be quite a bit different than the "ENV" mode. Both settings are useful and will provide a different response. As always a little bit of experimentation will go a long way.



S U M M A R Y

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- A detailed description of the problem

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If you don't have e-mail, you can call us at 1-802-951-9700.

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