WoodLofier

Woodman's Immaculate Maple Syrup Studio

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1.What

The WoodLofier is a "Lofi" plugin which combines 4 different sections to make your sound more "lofi" or to add some creative twist : filtering (and Sample Rate reduction), a Tape wobble unit, Noise addition and Crushing (clipping, bit reduction and saturation).
It also has 2 LFO's to modulate several parameters to bring more life/variation in the mix.
And it has a built-in 8 steps sequencer which allows to save/recall all the available parameters per step.

- Has input low pass and high pass filters.

- Has a sample rate (SR) reduction unit.

- Has a tape wobble unit.

- Has a signal dependant noise addition unit.

- Noise color can be set with a LP/HP/BP filter.

- Noise levels can be set with 5 advanced parameters.

- Number of bits per sample can be set.

- Has a clipping unit with auto gain and a lowpass filter for heavy distortion.

- Has a more subtle saturation unit.

- Has an 8-steps sequencer : each step can save/recall all the parameters.

- Sequencer can be started manually or started when Playing (transport) starts.

- Sequencer has a convenient beat/bar timing popup.

- Has 2 modulators.

- Modulator source can be internal LFO or external side chain

- Modulator destination can be tape rotation, tape depth, noise level, clip level or input amplitude.

- LFO Square has slew-rate control. (control at 100% generates triangle waveform)

- LFO's have convenient beat/bar timing popup.

- Presets can be stored in iCloud Drive (makes them available on all your devices).

- Presets can be switched with Midi Program Changes.

- Major controls can be set with Midi CC messages.

1.1 Signal flow

```
          ┌────┐     ┌────┐     ┌──────────┐     ┌─────────────┐          ⊕ ────────┐
  ───────▶│ LP │────▶│ HP │────▶│    SR    │────▶│ Tape Wobble │────────▶ (+)       │
      │   └────┘     └────┘     │ reduction│     └─────────────┘          ▲         │
      │                         └──────────┘                              │         │
      │                                                                   │         │
      │              ┌─────────────┐     ┌────────┐                      (X)        │
      │              │ White Noise │────▶│ Noise  │────────────────────▶  ⊗        │
      │              └─────────────┘     │ Filter │                       ▲         │
      │                                  └────────┘                       │         │
      │                                                                   │         │
      │                          ┌─────┐     ┌────────────┐               │         │
      └─────────────────────────▶│ RMS │────▶│ Noise Gain │──────────────┘         │
                                 └─────┘     └────────────┘                         │
                                                                                    │
  ┌─────────────────────────────────────────────────────────────────────────────────┘
  │
  │   ┌────────────┐     ┌──────────┐     ┌────┐     ┌───────────────┐
  └──▶│ Saturation │────▶│ Clipping │────▶│ LP │────▶│ Bit Reduction │────────▶
      └────────────┘     └──────────┘     └────┘     └───────────────┘
```
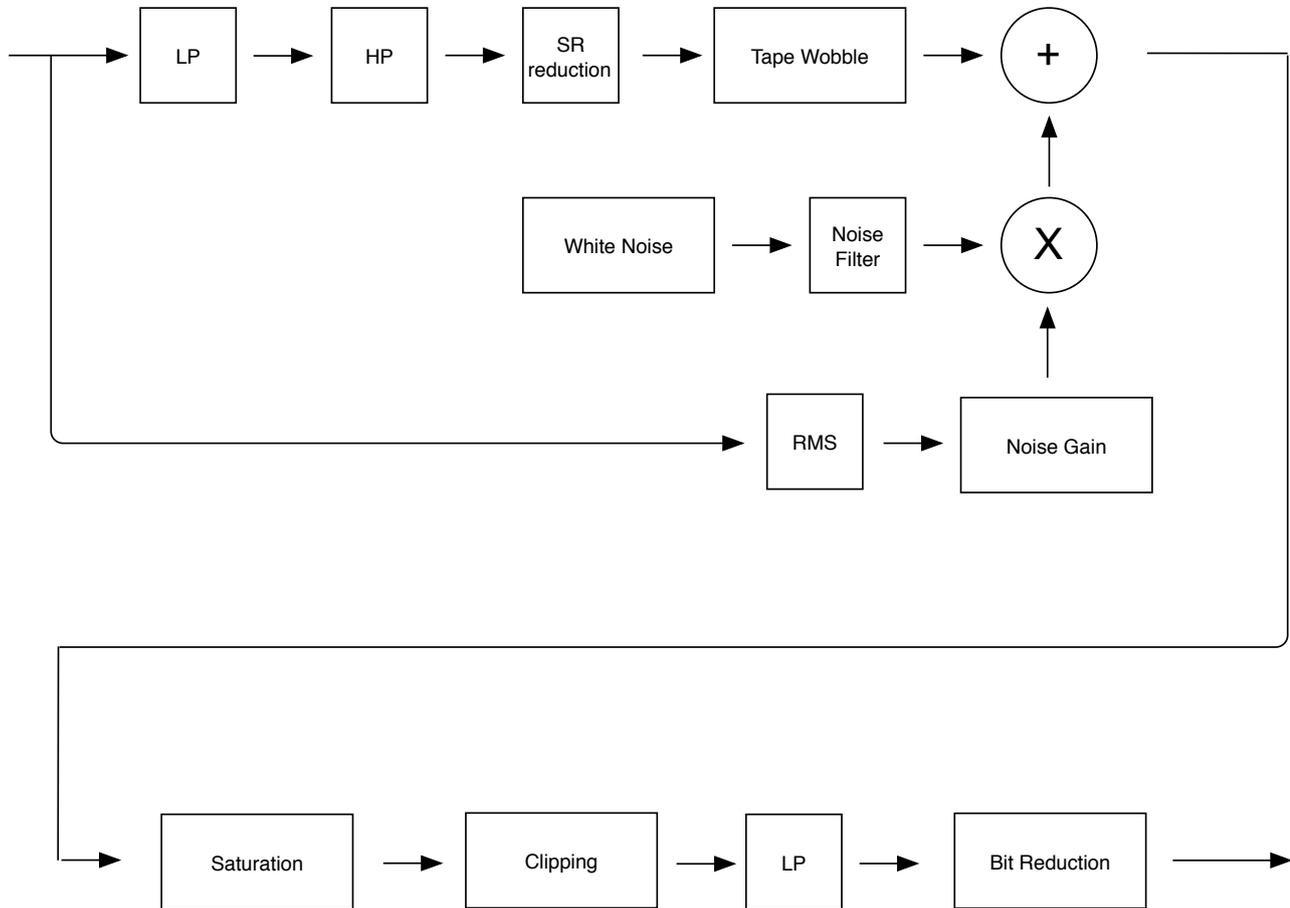
1.2 New

v1.1

- bug fix in Crush section causing AUM (and other DAW's) to stop producing output.

v1.2

- added Input and Output Gain controls (+ output clip led)
- added save parameter change to all sequencer steps
- added Tape Depth modulation

v1.3

- added AUv3 multi-bus (side chain) support.
- added Side Envelope mode.
- added Side Inverted Envelope mode.
- added Side chain gains.
- added Side chain signal leds.

2. Main window

Individual controls are explained below.

Most rotaries can be double clicked which will set a minimum value or toggle to the maximum value.

You have pressed the Question-mark button already as you are reading this manual.

2.1 Presets

Factory/User presets can normally be set via the DAW specific popup / controls. Those presets will be saved in a specific format and location dependant on the DAW.

User presets can also be set via WoodLofier's own popup in the header bar.

The preset.json files are saved in your iCloud Drive (when enabled) or else in the app's local documents folder.
When saved to iCloud Drive the presets are automatically available (and synced) to all devices and all DAW's running WoodLofier and are obviously backed-up as well.

When iCloud Drive is enabled, previously local saved presets will also be shown in the preset popup with ".local" appended to their name. And when for some reason a new preset still has to be written to the local folder, this can be done by appending ".local" to the name typed in the text edit box.

When a preset is selected and any parameter is changed afterwards, the name of the preset will be marked with a * at the beginning and end to indicate the settings are now different than those from the saved preset. When this preset is re-saved the * 's will disappear again.

Groups (drums, Vocals, …) can be created by typing the group name followed by a ":" (colon character) followed by the preset name. Multi level groups are possible as well on OSX.

The current selected preset can be removed by selecting "remove" from the popup however NO "Are you sure" warnings/popups are given. (I am sure you are sure).

The User presets can also be selected by a Midi Program Change. In the Advanced panel the Midi channel and Program Change mode can be set :
- mode "Index" : program change number is the index in the preset list
- mode "Name" : add ".midiXY" to the preset name to select it with program change XY. (e.g. the preset with name "snaredrum.midi3" will be selected by program change 3.

3. Advanced Panel

The Advanced panel can be made visible by pressing the "Advanced" button.

4. Filter Controls

4.1 Filter section on button

4.2 Low cut rotary

50 Hz … 20 kHz

All frequencies below this one are attenuated.

4.3 High cut rotary

50 Hz … 20 kHz

All frequencies above this one are attenuated.

4.4 SR (sample rate) reduction

Has the effect of a lowpass filter but with additional aliasing effects.

5. Tape wobble Controls

This emulates a tape machine where the motorspeed is not constant.

5.1 Tape wobble unit on button

5.2 Tape depth

0 .. 100%

Controls how much the motor speed deviates from the nominal speed.

5.3 Tape rotation frequency

0 .. 20Hz

The rotation speed in Hz (rot/s).

6. Noise section

Adds noise with an amount dependant on the level (rms) of the audio signal.
The Advanced panel has controls to fine tune these levels.

6.1 Noise unit on button

6.2 Noise Mix

0 .. 100%

0% is no noise added and 100% is only the noise.

6.3 Noise filter frequency

Sets the center (band-pass or notch) or cutoff (high-pass or low-pass) frequency.

50 Hz … 20 kHz

Allows to colour the (white) noise added.

6.4 Noise filter type (Advanced)

type can be set to band-pass, low-pass, high-pass and notch

6.5 "Q" rotary (Advanced)

0.1 ... 10

used in bandpass and notch filter types.

6.6 Low cut (Advanced)

when switched on an (independent from the filter above) low cut filter with cutoff at 120 Hz is applied on the noise.

6.7 Noise Threshold (Advanced)

-80 .. 0 dB

When the original signal rms is below this threshold, no noise will be added.

6.8 Noise Minimum Level (Advanced)

-80 .. 0 dB

Once the original signal is above the threshold, this minimum level of noise will be added.

6.9 Noise Ratio (Advanced)

0 .. 2

Once the signal gets louder than the minimum noise level, more noise will be added.

The final noise level (dB) = min_noise (dB) + ratio * (signal_rms (dB) - min_noise (dB))

So setting the ratio to zero will yield a constant noise level (= min noise level)

6.10 Noise RMS (Advanced)

0 .. 2000 ms

The time to measure the RMS of the original signal.

6.11 Noise Release (Advanced)

0 .. 4000 ms

7. Crush section

7.1 crush section on button

Enables/disables the clipping, the bit reduction and the saturation.

7.2 Clipping rotary

Adds gain to the signal so that it starts clipping which will be indicated by the red clipping led.

The clipping section has an auto gain so that the clipped signal does not sound louder than the original.

7.2.1 Clip Lowpass filter rotary (Advanced)

Clipping introduces a lot of harmonics and high frequencies. Therefore a lowpass filter can be applied on the clipped signal to tamper those sharp frequencies.

7.3 Number of bits per sample

When set low enough it will add quantisation noise. Smaller signals may also start to disappear.

Ugly.

7.4 Saturation

0 .. 100%

Acts more like the saturation effect of a tube amp : it will mainly add odd harmonics.

8. Other Controls

8.1 Dry-Wet rotary

0 … 100%

At 0% only the original audio is heard, at 100% only the "lofied" signals are heard.

8.2 Input Gain rotary (Advanced panel)

-30 .. +30 dB

Can be useful when the audio level is not high enough to drive the Saturation unit.

8.3 Output Gain rotary (Advanced panel)

-30 .. +30 dB

When the saturation is used the output signal RMS can be slightly lower than the input RMS. The output gain can be used to compensate for this.

When the output signal would be > 0dB, the output clip led will go on.

The output clip led is both present in the Advanced panel and in the Main panel (besides the Dry-Wet rotary).

9. Modulators

9.1 Modulation depth rotaries

Modulation depth in % (0 … 100%).

9.2 Modulation destination popup

Destinations can be :

• tape rotation
• tape depth
• noise level
• saturation level
• clip level
• input amplitude

When Modulation 1 and 2 are set to the same destination, the effect is combined.

9.3 Modulation LFO frequency rotary

LFO frequency in Hz : 0 … 40 Hz   or 0 … 400 Hz (when the X10 button is on)

When the modulation source is set to "Side chain" this control becomes a Side chain gain (0 .. 60 dB).

9.4 Modulation LFO beat/bar popup

When set to a fraction of the BPM, the LFO frequency will automatically be calculated and be adjusted when the BPM changes.

9.5 Modulation Source popups (Advanced Panel)

Sources can be :

- LFO Sine wave
- LFO Square wave (Triangle waveform can be obtained by setting the Slew rate to 100%)
- LFO Sawtooth Down
- LFO Sawtooth Up
- Side chain
- Side chain Envelope
- Side chain Inverted Envelope
- External side chain receive (requires a WoodLofier on the side chain track in Send mode)
- External side chain send (to send audio from a track to a receiving WoodLofier).

The LFO modes are displayed in the Main window and can also be toggled there.

When a Side chain mode is chosen the LFO frequency rotary in the main panel is replaced by a Side Gain rotary (0 .. 60 dB).

9.6 LFO Square wave slew-rate rotary (Advanced Panel)

Adjusts the slope of the Square wave.

When set to 100% the waveform becomes perfectly triangular.

10. Sequencer

The sequencer allows to store/recall all parameters for each of the 8 steps.
The sequencer can be started manually or when playing (transport) is started/stopped.

The 8 leds can be touched (iOS) / clicked (MacOS) and will have different colours depending on the state.

Sequencer NOT running :

touch a non selected led :

- blue : no parameters were saved yet in this step
- green : parameters were once saved AND they will be set

touch again the blue/green led :

- yellow : this step is now disabled and will be skipped when the sequencer is running.

touch again the yellow led :

- it will go back to the enabled state (blue or green)

pushing the Save button (button led becomes red) :

- the selected step led will become red
- if no steps were selected, select one.
- pushing another led will select that step for saving (red led)

pushing the Save button again (button led is red) :

- all parameters are saved in the selected (red led) step.
- the led colour becomes green (step saved !) or yellow (when the step was disabled)
- Save button led goes out.

Sequencer RUNNING :

the current step will light blue, green or yellow (see states above) and all other leds will be off.

touching a led will only allow to disable/enable that step.

10.1 Sequencer BPM Rotary

0 .. 800 bpm.

Sets the bpm to the DAW project bpm.

10.2 Sequencer step time popup

Has all the common beat values (1/4 , 1/8, …) including dotted notes.
1/4 corresponds to the BPM time.

10.3 Sequencer Start/Stop button

When the Start mode is "manual" , the sequencer will start immediately. The Start button led will light green.

When the Start mode is "Play", the sequencer is armed (blinking green button led) but will only start when the DAW transport is started.
In this mode the sequencer will also stop when the transport is stopped.

10.3.1 Sequencer Start Mode popup (Advanced)

Start/Stop mode can be :

- Off
- Manual
- Play

When the mode is set to Off, nothing will happen when the buttons or leds are pushed.
This can be useful to prevent accidentally changing the parameters when pressing a led (with a saved step). In this mode saving the plugin state or saving a preset will not save any (saved) steps.

10.4 Sequencer Save button

Can only be used when the sequencer is not running (and not disabled : Mode = off)

10.4.1 Save all parameters in 1 sequencer step

After pressing the Save button led will light red and when a step led was selected it will also change to red.
At this moment it is still possible to select anther step (led) in which to save all the parameters.

Pushing the Save button again saves the parameters for that step.

When the selected red led is pushed the Save button (and led) are disarmed and no parameters are saved.

10.4.2 Save 1 (or a few) parameters in all sequencer steps

After saving all steps with a for example a varying Noise filter, it may be possible you want to change another parameter (e.g. more Saturation, etc) for all steps. This can be done as follows :

- Press the Save button
- Change 1 (or more) parameters : all sequencer leds will now light red
- Press the Save button again : only the changed parameters) will be saved to all the steps.

10.5 Sequencer Skip Mode popup (Advanced)

Skip mode can be :

- Keep Timing
- Skip

This mode is used for the disabled steps (yellow led).

"Keep timing" will not change/set any parameters for that step but will wait for the step time to move to the next step.

"Skip" will immediately jump to the next (enabled) step.

11. Running on iOS (iPad, iPhone)

The WoodLofier app supports IAA (Inter App Audio) which allows audio host apps (supporting IAA) to use the WoodLofier.
Without a host app the use case for the WoodLofier standalone app could be to use your iOS device as a "hardware compressor" sending and receiving audio via the mic/headphone connector or via some audio docking station.

The WoodLofier app also contains the AUv3 audio unit plugin. Host apps using the AUv3 plugin will present the WoodLofier UI in their own window which usually can be resized. The WoodLofier UI will scale to follow the resizing.

The number of channels will normally be limited to stereo.

11.1 Presets

Presets can be loaded/saved via WoodLofier's preset popup.
The preset.json files are saved in iCloud Drive when enabled or else in the app's local Documents folder.
When saved to iCloud Drive the presets are automatically available (and synced) to all devices running WoodLofier and are obviously backed-up as well.

When iCloud Drive is enabled, previously local saved presets will also be shown in the preset popup with ".local" appended to their name. And when for some reason a new preset still has to be written to the local Documents, this can be done by appending ".local" to the name typed in the text edit box.

To Enable iCloud Drive you should be signed-in in iCloud (normally the case when you also want Contacts, Calendars, Mail, etc to be synced to iCloud) and the iCloud Drive switch should be on. Under iCloud Drive all apps using iCloud Drive are listed and obviously WoodLofier should be on as well (which it is by default).

One-level groups are possible by typing the group name followed by a ":" (colon character) followed by the preset name.

Presets for the AUv3 plugin can also be provided by the host app or can be saved/loaded via WoodLofier's popup as described above. Currently multi-level popups (groups) are not supported here.

The User presets can also be selected by a Midi Program Change. In the Advanced panel the Midi channel and Program Change mode can be set :

- mode "Index" : program change number is the index in the preset list
- mode "Name" : add ".midiXY" to the preset name to select it with program change XY. (e.g. the preset with name "snaredrum.midi3" will be selected by program change 3. This method is preferred as the selection will not change when presets are added or removed.

11.2 DAW Side Chain

Most DAW's allow to send audio from another track to the side chain input of WoodLofier on another track.
In WoodLofier you have to set the Modulator Source to "side" or "side envelope" or "side inverted envelope" to use this side audio as modulation signal.

In v1.3 this is now also supported for AUv3 on iOS which only recently implemented this side chain (or more general multi-bus) functionality. Of course the WoodLofier's own side chain mechanism described in 11.3 can also still be used.

In AUM on iOS for example it looks like below : the second track is sending its audio to the side chain input of WoodLofier on the first track. Note that the WoodLofier seen in the second track is actually the same as the one in the first track.
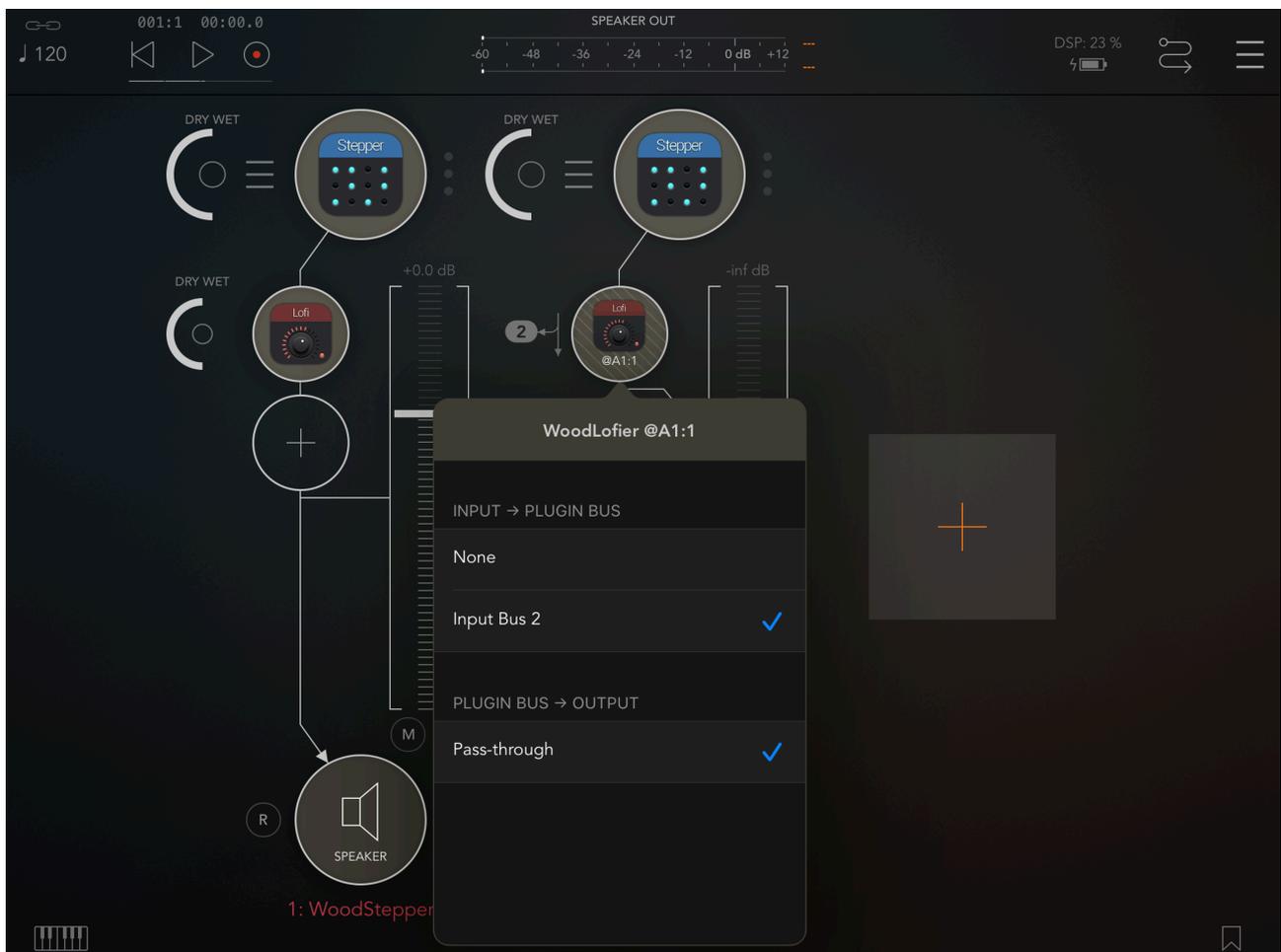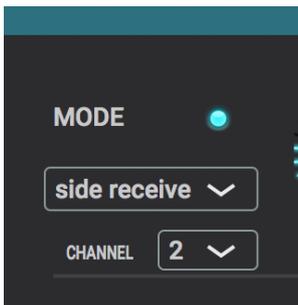
11.3 WoodLofier Side Chain

On iOS not many hosts are currently supporting a side chain mechanism.
Therefore WoodLofier AUv3 has its own side send/receive mechanism.

On the track you want to use as side chain (Bass drum for example), insert a WoodLofier and select Modulator Source mode (Advanced Settings) "side chain send". An extra popup will become visible in which you can select a side channel number (1..8).
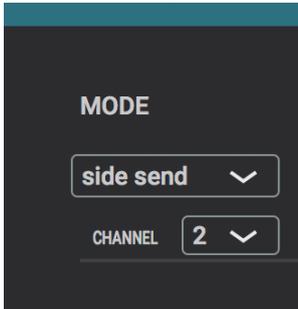
On the track you want to Lofi (Bass guitar for example) you insert a WoodLofier in which the mode is set to "side chain receive". Obviously select the same side channel number here.

The audio from the side chain track (Base drum …) will now be sent to the receiving WoodLofier (Bass guitar) and be used as modulation signal in stead of the LFO.

The receiving WoodLofier will show an extra led just above the mode popup.
When not lid, no audio from the side chain is received :
- check if the send WoodLofier has the same channel
- check if there is audio on that track (hosts will often not call the plugin's processing when no audio is present).

When blue, audio is received and completely in sync.
When orange, audio is received but different track latencies cause the side chain signal to be shifted in time compared to the receiving track audio.
When this happens and is giving bad results, try to get the same latency on both tracks by having the same number and types of plugins on each track as well have the 2 WoodLofiers at the same relative plugin position (last plugin for example).

Different receiving WoodLofiers can receive from the same send channel.

11.4 UI Zoom

Especially when used as AUv3 plugin in a host app, it can happen that the window in which the WoodLofier plugin is presented is too small (and sometimes can't be resized)

Pressing the "WoodLofier" logo (top left) will zoom in 3 steps to a maximum size.
Next press will cycle back to the un-zoomed state.

When zoomed the UI can be panned by dragging in any spot which is not a control.

12. Running on MacOS

The standalone WoodLofier app downloaded from the Mac App Store can be used as such but mainly acts as the license for all WoodLofier plugins (AAX , AU , VST).

This means there is no limit to the number of Macs on which you can run WoodLofier (as long as the standalone app is in the Applications folder).

Due to Mac App sandbox security, you have to download the plugin(s) from my website, un-zip the file(s) and move it/them to the normal plugin folder :
- for AAX : /Library/Application Support/Avid/Audio/Plug-Ins
- for AU : /Library/Audio/Plug-Ins/Components
- for VST : /Library/Audio/Plug-Ins/VST

When the standalone app is not present, the plugins will run in trial mode : every 60s the audio will be silent for 3s.

13. Midi CC controls (Advanced Panel)

When this button is on, CC commands received on the same channel set for Program Changes, will control following parameters.

Controller : Parameter

102 : Noise Mix
103 : Saturation
104 : Clipping
105 : Tape Depth
106 : Tape Rotation
107 : Input Low cut filter
108 : Input High cut filter
109 : Noise Out Filter
110 : Clip Out Filter
111 : LFO 1 frequency
112 : Modulator 1 depth
113 : LFO 2 frequency
114 : Modulator 2 depth
115 : LFO slew rates