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# Introduction - The Idea of Time Freezing

Infinite sound... Did you ever want to stop a sound just like a snapshot, so that it stays forever, without looping effects and without sounding like a synthesizer? I found a solution. Here it is: the TimeFreezer that freezes all kind of audio material and plays with it.





# Analysis and Resynthese.

Searching in all available Plugins and software in the world I couldn't find a tool that provides this in such high quality. I found a way of making an analysis of the sound and resynthesis that sounds so near to the original. And it is fast: depending on your system you will get a response within a few miliseconds.



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# Image: Image:

# Two versions of TimeFreezer:

The first version is an instrument that browses through a sound file. You can see the wave, place your cursor on a moment and immediately hear what it sounds like. After you can manipulate it with basic parameters like pitch, volume, bandpass filter, denoiser and the analysis size.

The second is a life effect. Instead of reading from a file it analyses the sound input of whatever you feed it with. This can be again any kind of audio material, like an instrument, a noise, a full orchestra or a sound scape of your choice. The description of this effect is here.





The software realisation is now made with the VST technology from Steinberg. This means that it is a plugin that you can use in every host that supports VST. If you need a stand alone version, there is also the possibility of loading it in a freeware VST-host like for example Tobybear Minihost (donation ware) or the VST host from Hermann Seib (freeware). Both hosts load exactly one plugin, wich is perfect for using the TimeFreezer in a session. But it has also been tested with many other commercial hosts like those: Steinberg Cubase and Nuendo, Ableton Live, Fruity Loops, Audiomulch, EnergyXt, Sonar and ohers. For now there are no known compatibility problems.

Since January 2008 the "Audio Units" for Mac OSX version is running. This means that you can now use the TimeFreezer with hosts like Logic, Garagaband, AU-Lab and many others.

Platforms: Windows (2000/XP/Vista) and Mac OSX (All), Universal Binary (MacIntel & PowerPC)

### TimeFreezer/1-VST-Instrument





# The basics of the TimeFreezer VST Instrument

The TimeFreezer VST Instrument is not a virtual MIDI synth like most of the others. It is not a sampler, it is not an emulation of a before existing hardware that has been realized with electronics in the past. The basic idea is a resynthesis of an analysed sound. Although those machines have existed already in the 70s, the quality of the sound never ever reached the original. The TimeFreezer allways works in two steps: analysis and resynthesis. This means, that an instant response of the keyboard is nearly impossible because of the huge amount of calculations that have to be done for achieving that. But there is already a solution for those who want to play "fast frozen sounds": The TF can remain as many presets as you have keys on a MIDI-Keyboard. So when you don't change all the settings all the time, you can play as fast as your environment allows it. Some settings don't take time at all, for example the volume, the pitch, and even the filter settings. The morphing time can also be set by the "fade time".

And now the functions of every button on next page.





max - with this button set you will have a maximized output of the resynthesized sound in any case there is a signal. No distortions are possible. This sound then directly goes into the filters.







hold - in case you dont have a MIDI device or a software MIDI output, here you can set the output to be "on" all the time. This is useful for pure computerbased performance. This switch will not be automated; it can be automated with the MIDI-commands note on/off







keyb. mode (keyboard mode) - when this button is on the "off" position, you get a sampler like use of your keyboard: every key has the same setting, but chromatic transpositions are given by the selected highest key. The velocity also controls the volume. Alsways the highest key is selected: this version of TF is not polyphonic; but keep in mind that there is no limitation in the complexity of the reproduced sound; it can be a single voice in stereo or mono, but it can also be a full orchestral range in any kind of tonality or instrumentation; also noises are also completely reproduced with the full range of audible frequencies.







open file - on the plugin itself, this is the button for the beginning of all: here you choose, which wave file you are going to use for playing. Just click and a file selector will allow you to browse your file system. The sound output should not be interrupted during that. Actually those types of wave files are supported: mono/stereo, 16bit, 24bit or 32bit float (the native format of VST). Other formats will be available in the future. If you have others, please convert them first into a supported format.







denoiser - this gives you the possibility of taking away the part of white noise of your source. When you put the level on very high, this will also grab out important parts of your sound, which might be interesting for those who work with electronic experiments.







morph time - this defines how fast the transitions between the settings are going; from 1/100s to 10s. This parameter affects the morphing time of all the others!







frequency - if "resonance" is not set to zero, this will be the center of the band pass filter; the range is from 20 to 20.000Hz. (the response is slowed down by "morph time")







resonance - this is the size of the just described band pass filter; this is a substractive filter, so that you never get distortions. (the response is slowed down by "morph time")



![](_page_12_Picture_4.jpeg)

![](_page_13_Picture_1.jpeg)

pitch - this repitches the output; the range is +/- one octave (the response is slowed down by "morph time"). The amplitude is customizable in the TimeFreezerFX.ini.

![](_page_13_Figure_3.jpeg)

![](_page_13_Picture_4.jpeg)

![](_page_14_Picture_1.jpeg)

main volume - main volume (also slowed down by "morph time")

![](_page_14_Figure_3.jpeg)

![](_page_14_Picture_4.jpeg)

![](_page_15_Picture_1.jpeg)

wave position - this allows you to browse in the loaded wave (windows .wav, 16 bit, 24bit or 32bit float, mono or stereo)

![](_page_15_Figure_3.jpeg)

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![](_page_16_Picture_1.jpeg)

wave zoom - this is the size of the analyze window; the range is from 500 samples to 1.5 seconds at 44.100Hz.

![](_page_16_Figure_3.jpeg)

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![](_page_17_Picture_1.jpeg)

TimeFreezer is the displayed name of the plugin in your host.

![](_page_17_Figure_3.jpeg)

![](_page_17_Picture_4.jpeg)

![](_page_18_Picture_1.jpeg)

Here is the name of the loaded sound file. Possible formats are 16bit, 24bit, 32bit-float, mono or stereo

![](_page_18_Figure_3.jpeg)

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![](_page_19_Picture_0.jpeg)

![](_page_19_Picture_2.jpeg)

#### **MIDI** implementation

![](_page_19_Figure_4.jpeg)

in Windows you find it beside of the dll. I ts named TimeFreezer.ini

![](_page_20_Picture_1.jpeg)

![](_page_20_Figure_2.jpeg)

![](_page_20_Picture_3.jpeg)

![](_page_21_Picture_1.jpeg)

Physical Music is a group of musical software related to physics. TimeFreezer is the first official release.

![](_page_21_Figure_3.jpeg)

![](_page_21_Picture_4.jpeg)

![](_page_22_Picture_1.jpeg)

# TimeFreezer/1-VST-Instrument TIME FREEZEB PHYSICAL MUSIC NET 11 Men. the addition of a second states OPEN FILE And the first of the particular states DENOISER n DOLD CEYB. MODE MOBPE TIME WAVE POSITION ----FREQUENCY RESONANCE PITCH 111 MAIN -1 VOLUME WAVE ZOOM

![](_page_22_Picture_3.jpeg)

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Since beginning of 2008 the "Audio Units" version for Mac OSX is available. The VST version using Steinberg Studio Technologies is stll existing for Mac and PC.

![](_page_23_Figure_2.jpeg)

![](_page_24_Picture_0.jpeg)

### **MIDI** implementation

![](_page_24_Figure_4.jpeg)

Keys play the TimeFreezer with velocity to volume information. Depending on the Keyboard mode keys transpose or select a patch.

Program change always changes patch (up to 128 different).

Pitchbend controls the pitch .

Modulation Wheel (ctrl#1) controls the resonance.

"Volume control" (ctrl#7) controls the freeze volume.

It is also possible to configure your own MIDI controllers through editing the file TimeFreezer.txt (Mac) or TimeFreezer.ini (PC).

TimeFreezer.txt

Don't modify the structure of this file, just change the values if you want.

filter frequency: ctrl 1 chan 1;filter resonance: ctrl 35 chan 1;pitch: ctrl 4 chan 1;volume: ctrl 7 chan 1;window position: ctrl 74 chan 1;window width by: ctrl 22 chan 1;denoiser: ctrl 24 chan 1;fade time: ctrl 33 chan 1;

pitchbend range: 12; keyboard mode (transpose/multiprog): t; number of prgs in memory(max 128): 128;

in Mac you find this file here: /Users/Shared/TimeFreezer-settings in Windows you find it beside of the dll. I ts named TimeFreezer.ini

![](_page_24_Figure_17.jpeg)

# Technical details and known restrictions

The required Speed and Memory size of the Computer are not relevant, but the fastest and bigest is always the best for a fast response. I consider a Mac G4 with 300 MHz or a Pentium III with 500 MHz as an absolute minimum to be "playable".

The grafics should be 24 or 32 bit; 16 bit slows down the response.

It is possible to use several instances of the TimeFreezer in one host, but it is more stable to open only one GUI at a time. It has been tested up to 10 TimeFreezers at the same time on a Pentium M. The "Audio Units" version is limited to 16 instances.

Asio works much faster than MME or DirectX.

On processors with variable speed it is recommended to fix the speed to the maximum value. Then the TimeFreezer is always prepared for the huge amount of calculation that have to come with a new situation.

### 1) Installation

On Mac OS-X the TimeFreezer is made of 3 .vst bundles TimeFreezer.vst, TimeFreezerFXmono.vst and TimeFreezerFXstereo.vst. or 2 components TimeFreezer. components and TimeFreezerFX.component.

Just place them in your VSTPlugin folder that you are used to. You may also create a sub-folder. For example <your main drive>/library/Audio/Plug-Ins/VST/ for the VST and <your main drive>/library/Audio/Plug-Ins/components/ for the Audio Units version.

On PC the TimeFreezer is made of 3 dll files. TimeFreezer.dll TimeFreezerFXmono.dll and TimeFreezerFXstereo.dll. Just place them in your VSTPlugin folder that you are used to. You may also create a sub-folder.

### 2) Registration

For Mac and for PC a registration file will be created online. The plug itself never connects to the internet.

Mac Users have to place this file manually without any change in this folder, which is created at thefirst start of the VSTi: <your main drive>/library/Preferences/TimeFreezer/

PC Users can register by double-click (executing) the file.

VSTi and VST FX are registered at the same time.

On problems just use the contact page.

3) How does the Keyboard mode work?

Keyb "off" means that a MIDI-keyboard produces a chromatic transpose just like a sampler. Keyb "on" means thet each key of aMIDI keyboard selects also a preset. Program 1 is middle C, Program 2 C# etc.

### 4) What is stored in a preset?

Every Knob/Fader position is saved in a preset except the "HOLD" button. The Path is also stored in the preset. This means that sounds are not themself in the preset -they are not limited in size . . . -If on Windows for some reason the drive letter will change, the the TimeFreezer is still able to find the Wave files.

5) What kind od Audio files are supported?

Mac: Wav and Aiff, mono or stereo, 16 bit or 24 bit with no compression PC: Wav and Aiff, mono or stereo, 16 bit, 24 bit and 32 bit float with no compression

note: some hosts don't allow multiple file type import. For Mac Aiff is preselected and for Windows Wav is preselected.

## 6) What can be automated?

Every button and Fader can be automated except the "Hold" button. "Hold" can be replaced by a MIDI-note. TimeFreezer listens to Host-Events and to MIDI-Events (also the effects)

7) How is MIDI interpreted?

Basically the VSTi responds to MIDI-Notes, MIDI-Hold-Pedal, PitchBend, Modulation Wheel. Other MIDI controllers are assignable. Default is now Control 10 (Pan) on different channels. MIDI settings and Controllers can be customized by editing this file: Mac: TimeFreezer.txt or TimeFreezerFX.txt in the folder <your main drive>/library/Preferences/TimeFreezer/ PC: TimeFreezer.ini or TimeFreezerFX.ini in the Windows-folder

# 8) Rendering

You must render at normal speed; for example you can configure to record the output of the freezer. If you try to render with a higher speed, then the result will not be the same. The reason is that the TimeFreezer does not work like most virtual synths. It is not deterministic. The more time he has, the more intermediate states he will implement.

# 9) Audio Units

There are some tiny differences in the parameter ranges in the Audio Units version. Also the saving of presets is handled in a different way.