



Wavelore American Zither Version 1.1

About the Instrument

The Wavelore American Zither was sampled across a range of three-and-a-half octaves (A#2-E6 sampled every third semitone), and is programmed with a range of A2-F6. There are six velocity layers, plus a special "virtual" layer that allows damping of ringing notes. Together with optional convolution modeling of the instrument's sympathetic string vibrations, scripts to add real-time controllable tremolo (rolls) and string damping/polyphony conservation make for a realistic, expressive, and haunting virtual instrument. Realistic rolls can be programmed or performed thanks to a full 12-way round robin sampling of every note and an extra script which tracks the round-robin state of each unique note and velocity layer.



About the Tremolo Script

Concept:

The American Zither was sampled with twelve alternate takes of each sample so that it can be played or programmed to perform repetitions at any speed without exhibiting the "machine gun effect" (the choppy, un-naturally repetitive sound that is typical of most sample libraries and synths when played with fast repetitions.) We have added a script in version 1.1 which allows the performance or programming of tremolos (rolls) that sound very natural. The included controls allow you to customize the behavior of this feature to your liking. The default setup uses the mod-wheel to switch rolls on and off, as well as to control speed between a nominal minimum and maximum. The default dynamics controller for rolls is CC#11 (Expression), although note-on velocity is an option. Also available are several presets which allow performance of fast repetitions by using release triggers (notes played when a finger is lifted from the keyboard) together with intelligent performance detection that is customizable to your keyboard technique and style.

Controls:

In the screenshot above, each of the controls for tremolo playing are numbered. Here is a description of the functions of each control.

- 1) *Min. Speed (ms) (Defaults to 175 ms, or about 4-5 repetitions per second):* When performing rolls using the mod-wheel at a value of 1, held notes will repeat at this rate. Set to taste.
- 2) *1) Max. Speed (ms) (Defaults to 50 ms, or 20 repetitions per second):* When performing rolls using the mod-wheel at a value of 127, held notes will repeat at this rate. Set to taste.
- 3) *Speed Control (Defaults to CC#1 or mod-wheel):* This is the MIDI controller used for switching rolls on and off, and for controlling roll speed.

- 4) *Dynamics Control (Defaults to CC#11 or expression control)*: This is the MIDI controller used for controlling dynamics during rolls. To force roll dynamics to adhere to the velocity the note was struck at, set this control to zero.
- 5) *Release Trigger Rolls (Defaults to "Never Repeat")*: This menu allows the choice of a number of presets:
 - a) *Never Repeat*: Bypasses all release-triggered rolls completely.
 - b) *Repeat Fast*: Notes will repeat if keys are released within 70 ms of the time they are depressed. The result is that rolls are played only when notes are struck and released very quickly. Ideal for playing rolls using the fingers of both hands in an alternating fashion, much as a percussionist would do with a pair of mallets. Pressing and releasing more slowly will bypass the repetitions. To adjust response, click in the "Max. Thresh" value field and enter the desired time in ms.
 - c) *Repeat Med*: Notes will repeat if keys are released within the range of 60-200 ms of the time they are depressed. The result is that rolls are played only when notes are struck and released moderately quickly. Also ideal for playing rolls using the fingers of both hands in an alternating fashion, this preset will bypass the repetitions if keys are struck and released very quickly, and also if they are struck and released more slowly. To adjust response, click in the "Min. Thresh" and "Max. Thresh" value fields and enter the desired times in ms.
 - d) *Repeat Slow*: Notes will repeat if keys are released within the range of 175 ms-10 seconds of the time they are depressed. The result is that repetitions are played only when notes are struck and released more slowly. This preset will bypass the repetitions if keys are struck and released moderately quickly. To adjust response, click in the "Min. Thresh" value field and enter the desired time in ms.
 - e) *Always Repeat*: This preset will cause any note, regardless of duration, to repeat on release of the key.
- 6) *Min. Threshold*: This field determines the minimum amount of time you must hold a key before the release of that key will trigger a new repetition of the same note.
- 7) *Max. Threshold*: This field determines the maximum amount of time you can hold a key for the release of that key to trigger a new repetition of the same note. Holding the key longer than the Max. Thresh value will bypass the release-trigger roll behavior.

About the Polyphony Conservation Script

Concept:

The Kontakt 2 version of the Wavelore American Zither uses a script which causes any repeated note to shut off any previous voices that are playing the same note, without interfering with other notes. This script is designed to do four things:

- 1) *Conserve polyphony*. If you play the same note repeatedly, the instrument will usually not use more than five voices of polyphony per pitch, unless your repetitions are extremely fast and the maximum release time is being used.
- 2) *Allow a natural playing technique* where keys are struck as strings on a zither would be struck with a mallet, but the notes will decay for their full duration, unless "damped" by pressing the keys again, but very gently. Therefore, repeating a note at a velocity of five or less will cut off any previously sounding voices that are playing the same note. This mimics the way in which a percussionist will sometimes perform a "secco" stroke by using a hand or mallet to stop an instrument from vibrating, either gently or abruptly.
- 3) *Allow all sounding notes to be dampened* using the sustain pedal. Any time the sustain pedal is depressed, all ringing notes will be stopped, with the abruptness of the cutoff determined by the values of the controls, described in the section below
- 4) *Allow increased realism*. Without this polyphony restriction, repetitions would quickly "pile up", resulting in a phased sound. A real mallet-percussion instrument would not behave this way. Rather, each time a note is struck, the string would be set in motion again, sounding a new note, and stopping the old one.

There is one exception to this rule, namely when a loud note is followed by a quiet one. In this scenario, the string continues to ring due to it's intense vibration from the loud strike, but the new, quieter note will dampen it slightly. This theory is the basis for the traditional "self mask" technique, where only louder notes shut off quieter ones, but not the other way around. However, self-masking does not take into account the way in which quieter notes interfere with louder notes. This script will allow quiet notes to gently take over louder ones. It accomplishes this task by fading original notes slowly when subsequent repetitions are played softly, and fading quickly when repetitions are played loudly.

Once the notes manipulated by the script are passed to Kontakt's convolution processor (using one of two included Impulse Responses taken from the body of the zither), damped and overlapped notes take on a further realism by creating sympathetic resonance. To hear this effect, play a high note (say, D#6) very loudly, and then again very softly. You'll hear the note fade out

fairly quickly, but a ringing effect is left, as if other adjacent strings were set in motion by the mallet striking the instrument.

Controls:

Note: To access the controls for this script, you must first click the small wrench icon at the top-left of the instrument (circled in red), then click the "script editor" button (circled in yellow), and finally click the "Intelligent Self-Mask" tab within the script editor (circled in green). This process will display the the controls (numbered in green), as shown below:



1) *Fade CC (Defaults to CC#11, at a value of 64):* Use this control to choose the MIDI Controller you will use to control the fade time of old notes. The script will automatically use velocity as the fade time controller when repeating notes with velocity above 5 (See 3), above). This user defined controller will change fade time between the specified minimum and maximum fade times (controls 2 and 3) when "damping" strings by playing notes with velocities of 5 or less, or when damping all sounding strings using the sustain pedal.

2) *Min Fade Time (Range from 20 ms to 200 ms, Default value of 150 ms):* Enter the desired minimum (fastest) fade time. This is the fade time that will be used for old notes when new notes are played at a velocity of 127, or when "damps" are performed with the Fade CC (e.g., the default CC#11, Expression controller) at a value of 0. For example, move CC#11 to a value of 0, play a note, then play the same note very gently. The original note cuts off in 150 ms. Lower Min Fade Time all the way to 20 ms and repeat the process - the note now cuts off very abruptly.

3) *Max Fade Time (Range from 250 ms to 1000 ms, Default value of 500 ms):* Enter the desired maximum (slowest) fade time. This is the approximate fade time that will be used for old notes when new notes are played at a velocity of 6, or when "damps" are performed with the Fade CC (e.g., the default CC#11, Expression controller) at a value of 127. For example, move CC#11 to a value of 127, play a note, then play the same note very gently. The original note fades out over 500 ms. Raise Max Fade Time all the way to 1000 ms and repeat the process - the note now fades out much more slowly.

Once Min. and Max. Fade times are adjusted to taste, velocity will automatically interpolate these values for repeated notes, and Fade CC will interpolate when notes are "damped".

About the Convolution Resonance

We created two stereo impulse responses of the American Zither: One with all the strings un-dampened, and one with the strings about half dampened. These “IR’s”, when used within Kontakt’s convolution processor, allow your choice of two levels of resonance. These resonances can be further adjusted using the convolution processors internal controls, offering a wide variety of choices. These resonance models interact with the output of the repetition script to allow even more realistic results.

When loaded, the American Zither defaults to having the “WLAZ_Open_Res.wav” IR loaded:



Alternatively, you may want to experiment with the “WLAZ_Damped_Res.wave” IR, which can be found in the directory where you un-zipped your installation package. This will typically be something like:

D:\Wavelore_American_Zither_16_Bit\WAVELORE AMERICAN ZITHER 16 Bit Samples\IR Samples\WLAZ_Damped\Res.wav

Once you find this file, simply drag and drop it into Kontakt's convolution processor, and it will be active. The mix and envelope settings we made for the open resonance model will remain active, so you may want to adjust these to taste.

For either IR, you may want to experiment with adjusting the envelope, size, filter settings, pre-delay, or wet/dry settings. Please see your Kontakt documentation for instructions on doing so.

Where to Get More Help

If you have any difficulties using this software instrument, or even if you'd just like to share your thoughts or make suggestions, please don't hesitate to contact us at:

support@wavelore.com

Also, please check our site (<http://www.wavelore.com>) regularly for updates to our products and product line.

For information on editing this instrument, please consult your Kontakt 2/ Kontakt 3 documentation.

Credits

The following people played important roles in the creation of this software instrument:

- Mark Belbin - Performance, audio editing, instrument design, KSP Scripting, documentation.
- Steven Miller - Audio engineering, quality assurance.
- David Harvey - Design concept, design.
- Nils Liberg – KSP scripting