



# ETHER-PHONE

VERSION 1.0 - FULL



# VIRTUAL THEREMIN

FOR KONTAKT 4.1 AND HIGHER

Welcome!

This help file contains an overview of Wavelore Ether-Phone virtual theremin for Kontakt 4. Reading it carefully and familiarizing yourself with the interface and parameters offered will allow you the most control possible when using this highly versatile and flexible instrument.

Enjoy!

## Table of Contents

<b><u>Before you Start: The Concept and Design of the Ether-Phone.....</u></b>	<b><u>3</u></b>
<b><u>I) What is a Theremin, and How Does it Work?.....</u></b>	<b><u>3</u></b>
<b><u>II) How Does All of That Translate to MIDI and Kontakt?.....</u></b>	<b><u>3</u></b>
<b><u>1) Quick Start.....</u></b>	<b><u>1</u></b>
<b><u>1.1) The Instrument at a Glance.....</u></b>	<b><u>5</u></b>
<b><u>1.2) “Enough Jargon! How Do I Play This Thing!?”.....</u></b>	<b><u>6</u></b>
<b><u>2) Editing the Instrument’s Setup.....</u></b>	<b><u>7</u></b>
<b><u>2.1) About the Main Page.....</u></b>	<b><u>7</u></b>
<b><u>2.2) About the Oscillator Edit Page.....</u></b>	<b><u>9</u></b>
<b><u>2.3) About the Effects Edit Page.....</u></b>	<b><u>11</u></b>
<b><u>2.4) About the Humanize Advanced Page.....</u></b>	<b><u>13</u></b>
<b><u>2.5) Saving Your Changes.....</u></b>	<b><u>15</u></b>
<b><u>3) Where to Get More Help.....</u></b>	<b><u>15</u></b>
<b><u>Appendix A: Factory Presets.....</u></b>	<b><u>16</u></b>
<b><u>Appendix B: Credits.....</u></b>	<b><u>17</u></b>

# Before you Start:

## The Concept and Design of the Wavelore Ether-Phone

Ether-Phone consists of several waveform samples, a pair of impulse response samples (“IR’s”), and a Kontakt instrument with extensive scripting to allow you a ridiculous degree of control over the playability and sound of the library. The instrument samples include a sine wave, sawtooth wave, triangle wave, square wave, white noise, and a full-rectified sine wave (the exact waveform created by the original theremin). The IR samples include an impulse response from an amp, and one from a concert hall. The instrument itself contains all the programming necessary to make easy changes to its sound and behavior, and all the important aspects of the theremin have been included. Additionally, the interface displays an image of a theremin, complete with the volume and pitch antennae, with two disembodied hands that show what your music would look like if it were played on a real theremin!

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### I) What is a theremin, and How Does It Work?

The theremin, originally referred to by its inventor, Leon Theremin, as the “Etherphone”, was one of the world's first electronic instruments. It is unique in that the instrument is never actually touched by the player; Rather, one's hands are waved in proximity to two antennae, one of which controls the instrument's pitch, and the other its volume. The nearer the hand to the pitch antenna, the higher the generated tone. Similarly, the nearer the hand to the volume antenna, the lower the volume of the generated tone. The instrument generates a constant tone, and separation between notes can only be created by dropping the volume hand to an inaudible level while changing the pitch with the other hand.

Vibrato is created by a variable degree of oscillation of the pitch hand, and can vary in speed and width from very subtle to heavily exaggerated.

The theremin has been used extensively in film score, and is particularly identified with sci-fi films, wherein it typically plays very eerie, lyrical, and heavily vibrato-laden passages. It has also been used in rock, pop, avant-garde, and novelty music throughout its history.

Though the original theremin design used a specific setup of tone-generation circuitry to make a single unique sound (A “full-rectified sine wave”, where the lower-half of the waveform is “flipped” to the positive side), modern theremins often offer more advanced controls for generating different kinds of waveforms.

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### II) How Does All of That Translate to MIDI and Kontakt?

**Portamento:** To allow the smooth carrying of one note to another, the Wavelore Ether-Phone uses portamento, a traditional synthesis trick, with some added innovations. The theremin can only play one note at a time, and is hence referred to as a “monophonic” instrument. The Wavelore Ether-Phone, similarly, can only generate one sound at a time, and playing different keys on the keyboard (or in the DAW) simultaneously will result in the pitches sliding from one to the next in the order played. See the [quick-start guide](#) below for a detailed description of how portamento works. There are three other things to be aware of when considering the use of portamento.

- The factory setup allows you to control slide speed with two possible types of input: The first is velocity. That is, the harder you hit the new note, the faster the slide will execute. The softer, the slower. The second is the factory assigned MIDI CC#5. Regardless of this controller's setting, velocity will still access a range of speeds; The value of CC#5 simply allows access to faster or slower ranges of speeds, depending on the currently active preset.
- Both the original note and the new target note may sound slightly out of tune at first, and will correct themselves to a reasonable accuracy within a moment afterward. This phenomenon is not inherent in the samples themselves, but rather, is a result of an algorithm that causes the instrument to “miss”, just like a real human would, and then “correct by ear”. This feature of “Pitch Humanization” is also adjustable and removable.
- Where a real theremin produces a constant tone which can only be silenced by dropping the volume hand to an inaudible level, the Wavelore Ether-Phone only produces sound when one or more MIDI notes are held. To silence the instrument, one can either release all keys, or alternatively, lower the expression pedal (CC#11) to a value of zero.

**Vibrato:** When you move your mod-wheel (CC#1, or other CC#, if you re-assign the factory vibrato controller) while playing a note on your keyboard, you will hear the sounding tone oscillate in pitch. Increasing the mod-wheel value

increases both the speed and the depth of the vibrato...but not exclusively: There is another factor that is changing the speed and width of vibrato with each new cycle of the pitch oscillation: *Randomness*.

A real theremin player cannot perform a vibrato (which is a cyclical movement of shaking the hand back and forth over a given central pitch) without each cycle being slightly different in speed and physical width from the last. He/she will always stay within practical constraints, but removing the human indeterminacy from this sound leads to the vibrato we typically hear from synthesizers and samplers: Constant, repetitive, and unrealistic. The width and speed of both parameters are all fully configurable, and randomization of each occurs automatically.

**Timbre:** As mentioned above, modern theremins are capable of producing a variety of possible timbres. We took this concept several steps further when developing the Ether-Phone, and made the instrument a 42-voice additive synthesizer. There are six oscillators, and each can be set to produce its own waveform. Each oscillator can produce up to seven partials (fundamental frequency plus six overtones), and can be assigned its own volume, pan, tuning, attack time, and release time. Within each oscillator, each partial can be given its own volume range and curve, allowing very dynamic and timbrally expressive sounds.

**Effects:** Given that the theremin is an electronic instrument, it can, much like an electric guitar or keyboard, have its signal processed through any combination of effects units. We included delay, reverb, distortion, saturation, a rotating speaker simulator, and an amp model, all of which can be independently activated and controlled.

# 1) QUICK START

## 1.1) The Instrument at a Glance

When you load the Wavelore Ether-Phone into Kontakt, you will see the main page of its user interface:



This page gives you immediate access to the most common settings. For detailed info on all the controls, please see [Section 2, “Editing the Instrument”](#). For now, the curious may get a lot from knowing that the controls have all been labeled and organized for intuitive navigation and use, so this document may only be necessary if you find something in the interface to be less-than-clear.

Here are the factory settings for MIDI controllers used (these are re-assignable – again, see [Section 2, “Editing the Instrument”](#), for details):

**CC#1 (Mod-Wheel):** Vibrato.

**CC#5:** Controls portamento speed range; Lower values will access faster portamento speeds, and higher values will access slower speeds. Within any given range, velocity of target notes will determine the speed selected, unless velocity response is set to zero.

**CC#11 (Expression Pedal):** Volume control. Note that you can disable response to CC#11 by clicking the volume hand (shown as a palm-down open hand at the top right). Click it again to re-activate CC#11.

## 1.2) “Enough Jargon! How Do I Play This Thing!?” or Understanding the Ether-Phone In 5 Easy Steps.

For all the mumbo-jumbo presented so far, playing the Wavelore Ether-Phone is surprisingly easy. With the default bank/patch loaded (that is, load the instrument in its factory state), do the following.

- 1) Play a note on your MIDI keyboard. Play it while moving the mod-wheel. Notice that the pitch oscillates, and that the pitch hand on the interface wiggles along with the sound.
- 2) Play the note again, and hold it while playing a different note. Hey - A slide! Do it again, but this time be sure to hold both notes, then release the last note so that the pitch slides back down to the first. Sliding in this way will work between any two or more notes.
- 3) Repeat step 2 several times, each time striking the new note at a different intensity. Notice how the speed of the slide is proportional to how hard the second note was struck, as well as how the speed of the slide invoked by releasing that key matches the speed of the first slide. In this way, you can play slides of varying speeds using just note-on velocity, rather than having to move a controller each time you want a different speed.
- 4) Repeat step 2 or 3, adding vibrato with the mod-wheel any time you feel like it.
- 5) Play and hold any note while moving CC#11 – Note how the volume of the instrument changes. CC#11 simulates the movement of the hand near the volume antenna of the theremin. Controlled use of CC#11 allows real-time control over attack and release, as well as allowing the reduction of volume during slides, so that the effect of portamento is less audible. Try this some more, selectively adding vibrato using CC#1. Notice how the combination of slides, volume control, and vibrato results in a very expressive sounding performance. Depending on the preset being used, the volume of the instrument might not change much (or at all), as some presets have the volume curves for various partials reduced to a flat response. See [Appendix A: “Factory Presets”](#), for more information.

## 2) Editing the Instrument's Setup

There is always a possibility that a given instrument configuration will not behave in the way you may prefer. Given the enormous number of possible opinions on how any instrument should be configured, we've done everything possible to offer the best out-of-the-box programming we can in this library, but you may still have certain reservations or differences of opinion. These differences could be about a wide variety of choices, including:

- Choice of assigned controllers: Many may want, for example, to have the instrument use different controllers for vibrato and portamento speed, where our configuration uses the mod-wheel and CC#5, respectively.
- Vibrato style: Our choices for each preset vary in speed and intensity. You may find a need for a more or less aggressive vibrato.
- Slide speed ranges: You may only want your slides to vary from half a second in length to a full second, whereas our original setup offers a range from very fast to very slow. You can configure slide speed ranges and control sources in almost any variety you wish.

In addition to these variables, there are countless other ways in which the instrument could be different, and some of those ways could be better, at least for certain people or projects. This section contains instructions on some of the many ways that you can customize the sound and behavior of the Ether-Phone to suit different needs or tastes.

### 2.1) About the Main Page (Default View)



#### Concept:

In the screen-shot above, the various knobs and buttons allow you to configure the slide/vibrato behavior and sound, the activation of oscillators, use of effects, and to save and load presets.

## Controls:

- 1) *Speed CC#*: Sets the MIDI continuous controller for slide speed. In the factory setup, this option is set to CC#5, and slide speed will also be influenced by velocity.
- 2) *Velocity Response*: Sets the extent to which velocity will affect slide speed. When performing portamento slides on the keyboard, the factory settings will cause target slide notes that are played harder to slide faster than target slide notes that are played more softly. Reducing this setting to zero will “lock” slide speeds to that determined by the current value of the CC# specified in item #1, above. We recommend using the factory settings, as it allows greater expressivity in real time without demanding the use of another realtime CC#.
- 3) *Minimum Speed*: Sets the duration in milliseconds of the fastest possible portamento slide. This is the duration of the slide when played with CC# (and optional velocity) at its lowest value.
- 4) *Maximum Speed*: Sets the duration in milliseconds of the slowest possible portamento slide. This is the duration of the slide when played with the CC# (and optional velocity) at its greatest value.
- 5) *Vibrato CC#*: This assignable controller will invoke vibrato when set to a non-zero value, as well as control the width and depth of the vibrato.
- 6) *Maximum Vibrato Speed*: This knob sets the maximum speed of the vibrato in cycles per second (Hz). For example, when the maximum speed is set to 10 Hz, any time vibrato is fully invoked, it will fluctuate the pitch of the instrument from in-tune, to fully sharp, to fully flat, and finally back to in-tune, ten times each second.
- 7) *Maximum Vibrato Depth*: This knob sets the maximum width of vibrato in cents (hundredths of a semitone).
- 8) *Activate/Deactivate Oscillators*: These buttons are on/off switches for each of the six oscillators. For each preset, the six oscillators may have its own settings as specified in the oscillator editing page, as well as its own on/off status, since it is unlikely that all oscillators will be used simultaneously.
- 9) *Activate/Deactivate Effects*: These buttons are on/off switches for each of the effects. For each preset, each effect may have its own settings as specified in the effects editing page, as well as its own on/off status.
- 10) *Edit Oscillators*: This button takes you to the oscillator edit page, where each oscillator can be given its own specific settings, as described in [section 2.2. “The Oscillator Edit Page”](#), below.
- 11) *Edit Effects*: This button takes you to the effects edit page, where each effect can be given its own specific settings, as described in [section 2.3. “The Effects Edit Page”](#), below.
- 12) *Load Preset*: This menu is used to load a factory or user preset. See [Appendix A: “Factory Presets”](#), below, for descriptions of each factory preset's settings.
- 13) *Save Preset*: This menu is used to save a user preset. When saving presets, all user interface settings are stored, meaning portamento and vibrato settings, as well as all settings for oscillators and effects.
- 14) *Pitch Antenna*: Clicking the top of the pitch antenna will bring up a menu from which you can choose the range of the pitch wheel on your keyboard, from zero to twelve semitones.
- 15) *Hand Display*: When you play your MIDI keyboard, the pitch hand will move horizontally, reflecting the current note played. Since the instrument occupies the whole MIDI note range, pitch hand movements may not necessarily be very large. To force the pitch hand to reflect a smaller range of pitches, play the lowest and highest notes you intend to use, while the expression pedal is set to zero. Doing so will set the range over which the pitch hand will react. After setting the range, any notes which exceed the minimum or maximum will automatically expand the range. The volume hand moves vertically to reflect the current value of CC#11. To disable animation, click the pitch hand so that it turns transparent. To disable volume control (set all notes to full volume), click the volume hand so that it turns transparent.



## 2.2) About the Oscillator Edit Page



### Concept:

The Oscillator Edit Page displays all settings peculiar to the currently selected oscillator, as well as redundant display of the oscillator activation buttons, pitch wheel antenna menu, and hand display shown on the main page. Each oscillator can have its own global settings (waveform type, master volume, transpose, tune, pan, attack, release), as well as minimum/maximum volume and expression curve definitions for each of up to seven partials.

### Controls:

- 1) *Waveform Type*: The instrument contains the following waveforms: Sine wave, triangle wave, rectified sine wave, sawtooth wave, square wave, and white noise. Setting type will cause all active partials of the currently selected oscillator to sound the selected waveform.
- 2) *Oscillator Master Volume*: Sets the master attenuation for the selected oscillator. Using all seven partials at full volume, for instance, may cause clipping, so lowering the master volume in this event will save you the trouble of lowering all partials' volume ranges separately.
- 3) *Transpose*: Transposes all sounding partials of the currently selected oscillator by the chosen number of semitones, up to +/- four octaves.
- 4) *Tuning*: Tunes all partials of the currently selected oscillator by the defined number of cents (hundredths of a semi-tone).
- 5) *Pan*: Pans all partials of the currently selected oscillator to the defined point in the stereo field.
- 6) *Attack*: Sets all partials of the currently selected oscillator to fade in over the chosen number of milliseconds. Note that the effect of the attack setting will only be heard if CC#11 is set to an audible level at the time a new key is struck. Otherwise, the note fades in according to how CC#11 is operated, allowing real-time control over the

fading in/out of the sound.

- 7) *Release*: Sets all partials of the currently selected oscillator to fade out over the chosen number of milliseconds. Note that the effect of the release setting will only be heard if CC#11 is set to an audible level at the time the last held key is released. Otherwise, the note is already inaudible at the time it fades.
- 8) *Partials Dynamics*: The seven horizontal sliders pictured here each represent the volume settings for their respective partials of the currently selected oscillator, where the bottom slider is the fundamental frequency, and the top slider is the sixth overtone (or seventh partial). Each slider has a green handle and a red handle: The green handle represents the minimum volume for its corresponding partial, the red handle the maximum volume. Setting the green handle to minimum (-Inf) and the red handle to maximum (0dB) will allow that partial a full dynamic range over the range of CC#11, meaning that sweeping CC#11 from 0 to 127 will fade the corresponding partial from inaudible to full volume. Reducing the maximum or increasing the minimum will narrow the partial's dynamic range accordingly. Defining these settings differently for each partial allows a great range of expressive and timbral possibilities.
- 9) *Partials Volume Curves*: Each of these menus can be used to define the corresponding partial's volume/CC#11 value curve. Setting the curve to "flat" will eliminate any response to CC#11, instead setting that partial's volume to maximum. Alternatively, any of the other curves will allow the full defined volume range, but with differing speeds of response as CC#11 sweeps from 0 to 127. The optimal setting for most applications is "Fast Curve".
- 10) *Activate/Deactivate Oscillators*: These buttons are on/off switches for each of the six oscillators. For each preset, the six oscillators may have its own settings as specified in the oscillator editing page, as well as its own on/off status, since it is unlikely that all oscillators will be used simultaneously. These are the same controls shown on the lower-left half of the main page, but are included here for convenience when auditioning new combinations of oscillator settings.
- 11) *Current Oscillator*: This menu is used to change which oscillator's settings are currently displayed on the page. In addition to this control, clicking any of the activate/deactivate buttons at the bottom will display the settings for that oscillator.
- 12) *Main Page*: This button takes you back to the main page of controls. For example, click this button if you wish to save your settings as a new or existing preset using the save preset menu.
- 13) *Edit Effects*: This button takes you to the effects edit page, where each effect can be given its own specific settings, as described in [section 2.3, "The Effects Edit Page"](#), below.

## 2.3) About the Effects Edit Page



### Concept:

The effects edit page contains all important settings for each of the included effects. Set to taste, and re-save your preset to enable full recall of the settings. Note: No settings are included for the rotating speaker simulator or humanization. The rotating peaker has one variable, namely its speed, which is controlled by CC#1. Also note that when this effect is enabled from the main page, CC#1 will not invoke vibrato. The settings for humanization are accessed by double clicking the "Human" button on the main page.

### Controls:

- 1) *Delay Time*: Sets the time between repetitions when the delay effect is active.
- 2) *Delay Feedback*: Sets the number of repetitions the delay effect will play. Note that the number of repetitions does not correspond strictly to the numerical display, but rather is to be set to taste.
- 3) *Delay Wet Signal Level*: The volume of the repeats created by the delay effect.
- 4) *Delay Pan*: At maximum, the delay effect will pan alternating repeats to opposite ends of the stereo field. At minimum, the delay effect will generate repeats in mono.
- 5) *Distortion Amount*: Set the amount of distortion.
- 6) *Distortion Gain*: A volume compensation setting, to be used when distortion amounts cause excessive volume.
- 7) *Saturation Amount*: Set the amount of saturation. This effect is place after all others in the effects chain, so please note that delay and reverb, for instance, will also be saturated by the effect. The intention is to allow "lo-fi" simulation.

- 8) *Saturation Gain*: A volume compensation setting, to be used when saturation amounts cause excessive volume.
- 9) *Amp Reverb*: Use this knob to increase/decrease the amount of spring reverb included with the amp model.
- 10) *Amp Tone*: This knob controls the tone of the amp, when the amp model is active.
- 11) *Reverb Time*: Sets the length of the reverb tail when reverb is on.
- 12) *Reverb Wet Signal Level*: Sets the amount of reverberated signal to mix together with the dry sound of the theremin. Adjust to taste.
- 13) *Reverb Color*: This knob sets a low-pass filter frequency, above which the reverberated signal is attenuated. Use it to change the color of the reverberated sound from bright to dark.
- 14) *Master Volume*: Since different combinations of oscillators and effects can cause widely varying output levels, we included this control to allow compensation for clipping or inadequately low levels.
- 15) *Activate/Deactivate Effects*: These buttons are on/off switches for each of the effects. For each preset, each effect may have its own settings as specified in the effects editing page, as well as its own on/off status. These are the same controls shown on the lower-right half of the main page, but are included here for convenience when auditioning new combinations of effects settings.
- 16) *Edit Oscillators*: This button takes you to the oscillator edit page, where each oscillator can be given its own specific settings, as described in [section 2.2, "The Oscillator Edit Page"](#), above
- 17) *Main Page*: This button takes you back to the main page of controls. For example, click this button if you wish to save your settings as a new or existing preset using the save preset menu.

## 2.4) About the Humanize Advanced Page



### Concept:

NOTE: This page of controls is accessed by double-clicking the “HUMAN” button on the main page.

Wavelore Ether-Phone's internal script contains an algorithm that models the behavior of a real thereminist. In real life, there is practically no such thing as playing perfectly in tune, but software instruments typically do just that. This inaccuracy is part of what makes traditional sampled instruments sound false. We have programmed a way for the instrument to randomly “miss” notes (like a real player would), and then, after a short delay, to automatically adjust the tuning to somewhere closer to the intended tuning. We call this “humanization” of pitch. Different behaviors can be used for “new” notes (when you first hit a key on your keyboard, for upward slides, and for downward slides. Please see the screenshot above and the relevant explanations of the controls for a detailed understanding of how pitch humanization works.

### Controls:

*1-2) Miss-By-Between Minimum/Maximum – New Note.* The flattest and sharpest that a new note will sound, in cents (hundredths of a semitone). In the image above, the range is set to +/- 20 cents. This means that when you hit a key on your keyboard, the note(s) sounded will start somewhere between ¼ semitone flat and ¼ semitone sharp; The instrument will pick an amount from within this range randomly each time.

*3-4) Wait-Between Minimum/Maximum – New Note.* These two values (in milliseconds) represent the possible range of the virtual thereminist's “reaction time”, or the time it takes the player to hear the tuning of the note, and begin to correct himself. As with the “miss-by-between” values described above, the script will choose a random time duration by which to delay correction from within the range defined by these controls.

*5-6) Correct to Within Minimum/Maximum – New Note.* These variables define the accuracy of the virtual player's correction of the initial pitch offset. Notice that their values can exceed 100% (perfect correction), meaning that the script actually over-corrects the tuning. For example, if the script chooses an initial offset of -25 cents (¼

semitone flat), an 80% accuracy will correct by +20 cents, landing the pitch at -5 cents (1/20 semitone flat), where an accuracy of 120% will over-correct by +5 cents, landing at 1/20 semitone sharp.

*7-8) Over-A-Period\_Between Minimum/Maximum – New Note.* These variables define the speed at which the instrument corrects the pitch, once the correction has begun.

*9-16) Upward Slide Settings.* These 8 controls are identical to controls 1-8, but they govern how notes are missed and corrected when the note is arrived at via an upward (ascending slide).

*17-24) Downward Slide Settings.* These 8 controls are identical to controls 1-8, but they govern how notes are missed and corrected when the note is arrived at via a downward (descending slide).

*25) Preset Menu:* Use this menu to choose a factory preset from “A+” to “F”. Presets are named as if a grading system were applied to the player’s accuracy, A+ being near-perfect, and F being very out-of tune. Generally, the lower the grade, the greater the initial offset, the wait time, and the time taken to correct, and the lesser the accuracy.

*26) Main View:* Click this button to return to the main page of Wavelore Ether-Phone’s interface.

## 2.5) Saving Your Changes

If you've gotten this far in the manual, you're probably familiar with all the controls available for this instrument and how to use them, and you've probably discovered some sounds you like (We sure hope you have!). Once you've made changes that you like, you need to save your preset in order to recall them! To change which preset loads by default when you open the instrument when running Kontakt in standalone mode, you must re-save the instrument from Kontakt's "File" menu. When using the Ether-Phone within your DAW, the active preset and its settings will save and re-load with your project.

Once you've saved the preset, all your effects and performance configuration tweaks will be instantly recall-able using the load preset menu.

## 3) Where to Get More Help

At Wavelore, we consider it our duty to ensure that you have the best possible experience with our products and support.

***If you're having trouble, e-mail us and we'll help you!! We're at:***

[support@wavelore.com](mailto:support@wavelore.com)

There is also a support section on our website which will contain updates to the product as they become available, and currently contains links to a number of useful resources, including a link to our forum. We'd appreciate you addressing any problems there, since the more questions are asked and answered in the forum, the more useful a resource it can become for our users over time. That said, please don't hesitate to contact us at the e-mail address above for direct support.

# Appendix A: Factory Presets

## Lydia

“Lydia” is named for a famous thereminist on whose playing style its settings based. It uses a moderately wide and fast vibrato, with brisk portamento settings, and a fairly accurate pitch humanization, mimicking her tight performances while maintaining a considerably expressive and human style. The default oscillator for “Lydia” is the rectified sine-wave, which emulates the classic tone of the theremin. The other oscillators allow alternative choices of waveform.

## Clara

“Clara” is named for another famous thereminist on whose playing style the settings are based. It uses slightly wider vibrato, portamento, and humanize settings than “Lydia”, since “Clara”s style of theremin playing was somewhat “wilder” than “Lydia”s. Other settings for effects and oscillators are the same for both presets

## Mars Attacks!

“Mars Attacks!” is our attempt to evoke the imagery of classic sci-fi movies like “The Day the Earth Stood Still”, where the classic theremin sound is used to great effect of creating otherworldly sounds. This preset is similar to “Lydia” and “Clara”, but it uses much more pronounced vibrato and portamento speed, and adds a sine wave to the full-rectified sine wave for a smoother, more vocal sound. It also uses more reverb and some delay for a “spooky” ambiance.

## Final Frontier

Although the original Star Wars series' theme melody was sung by a vocalist, many people associate the tune with the theremin; This preset is an attempt to emulate the sound of that voice – not so much to reproduce it to 100% accuracy, but to reproduce what you may remember it as sounding like. Note as you move your expression pedal that the volume doesn't change as much as the timbre does; This setup is implemented to allow a certain degree of “wah” effect, emulating, to some extent, the shaping of vowels.

## Good Vibrations

Another well known piece of music that people often mistake for featuring a theremin is the classic Beach Boys single for which this preset is named. Contrary to popular belief, the instrument on the track is not actually a theremin, but a “tannerin” - an electronic instrument that was designed to imitate a theremin, but with greater ease of playing, since the tannerin is played by moving a handle to the desired pitch. The other important difference is that the tannerin actually just uses a simple sine wave, as opposed to the slightly more complex sounding rectified sine. Vibrato, portamento, effects, and humanization are configured to emulate the playing style on the namesake song.

## Planet Caravan

This preset is an organic sounding, synthesized wind instrument based on a sound heard in the namesake psychedelic tune from Balck Sabbath's album “Paranoid”. Subtle overtones are boosted as CC#11's value is raised, pitch is slightly humanized, and vibrato is narrow and somewhat slower than the other factory presets. Reverb and delay emulate the ambiance heard in the song, and a noise generator on the second oscillator is included as an option for emulating breath noise at higher dynamics. Portamento speed is restricted to a small range of fast responses to simulate legato fingering on a whistle or flute.

## Erhu

Named for the traditional Chinese bowed string instrument that it resembles when played in higher registers, this preset is a good example of the use of complex partial configurations; All seven partials of a sine wave oscillators are used, and the higher partials are attenuated by widely varying amounts at lower CC#11 values, becoming distinctly louder at higher values. The setup results in a wide-ranging timbre over the instrument's dynamic range. Sharp vibrato and a range of portamento speeds responding to velocity are used for a very expressive range of articulations.

## Tuning the Radio

“Tuning the Radio” is an example of creative sound design using the Ether-Phone's oscillators in non-musical ways. Starting with a white noise oscillator, a high partial sine wave is added (fade it in and out with CC#11), and a high partial sawtooth wave creates a digital “foldover” effect, modulating wildly when the pitch is changed. Using any combination of



portamento, pitch wheel, or vibrato (CC#1), the sawtooth will continue to modulate, creating a sort of “cosmic slop” effect.

### **Dogs of Doom**

Led Zeppelin's Jimmy Page is a well known player of the theremin in rock music, but used it unconventionally, as more of a sound effect than as a melodic instrument. The classic track, “No Quarter”, from “Houses of the Holy” features Page using the theremin to create an eerie effect after singer Robert Plant sings, “The dogs of doom-a-howl and moan”. This preset is modeled more after Page's *live* work on the theremin, where he often uses liberal amounts of delay and distortion.

### **Synth 1**

This synth patch has fast portamento, wide, fast, mechanical vibrato, and the oscillators have been set up to fade in specific overtones over the range of CC#11 for realtime timbral morphing. Experiment with enabling/disabling the various oscillators for different combinations of waveforms.

### **Synth 2**

Similar to “Synth 1”, this preset is generally intended to use oscillator 1+4, 2+5, or 3+6, and those pairs are matched, panned opposite one another, and have the second of the pair detuned to create a rich stereo effect.

### **Rock Organ**

“Rock Organ” has one partial on each oscillator, allowing simulated switching of organ stops. All oscillators except the first will fade in over the range of CC#11 for realtime control of each stop's volume. Liberal distortion enriches the overall sound, and a heavy ambiance gives the organ an “arena rock” vibe. Note that the rotating speaker simulator is used on this preset, that its speed is controlled by CC#1, and that it bypasses the use of vibrato,

## **Appendix B: Credits**

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

Mark Belbin - Audio editing, instrument design, documentation.

Luke Merdsoy, Mertz Creative Communications Inc. - Wavelore logos and visual concept. <http://www.mertz.ca>