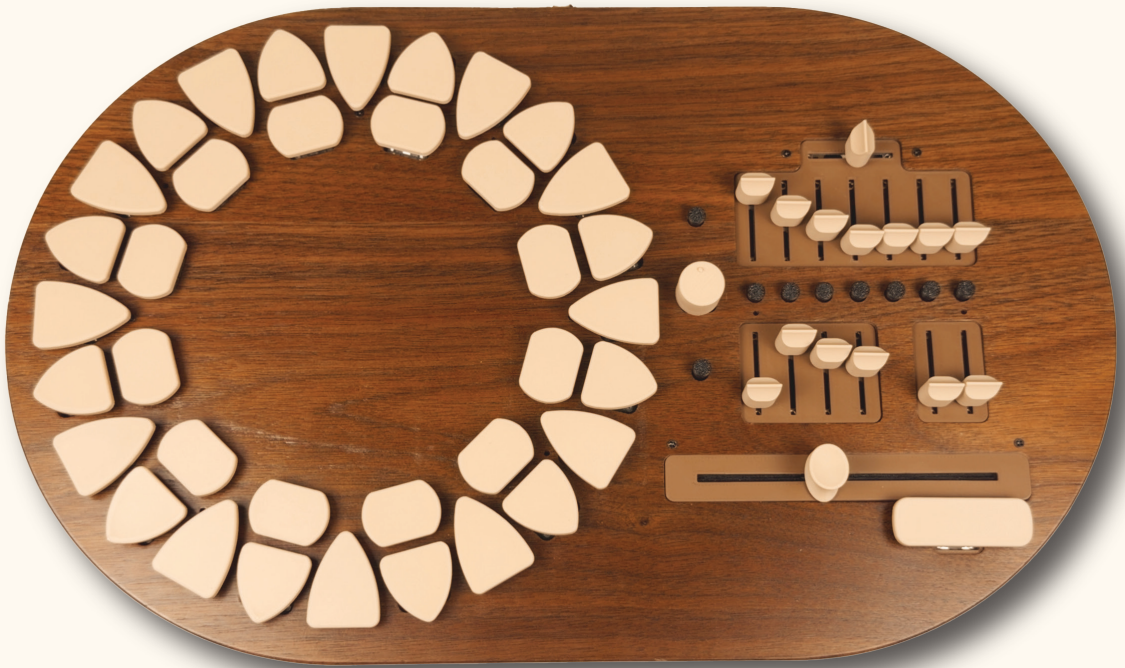# Nymira

Harmony, at your fingertips

Terraphones

Nymira is a standalone harmony instrument designed around the circle of fifths. Its sonic engine draws from the overtone series, offering detailed timbral control across seven individual partials. Three distinct models explore different synthesis methods; one rooted in additive FM synthesis, another in classic subtractive design, and one based on granular synthesis. Together, they provide a new, expressive way to shape rich and complex harmonic textures.

Nymira is the only instrument in the world that maps the Circle of Fifths to a physical interface. Nymira is designed with Western harmonic theory at the core, allowing you to discover beautiful chord progressions that are much harder to play on other instruments.

Like all Terraphones, Nymira is assembled by hand, and is housed in solid walnut sourced in the USA. Underneath Nymira's keys are Cherry MX Silent Red keyswitches that offer a clean, tactile experience. With the ability to run on four rechargeable AA batteries, Nymira lets you play anywhere. Inside Nymira are two surface transducers that turn the walnut enclosure into a speaker of its own. Playing Nymira in this mode allows you to hear its warm sonic engine played through the walls of its walnut housing. Nymira also excels in the studio. It is equipped with USB MIDI out, and a stereo 1/4" audio output. If you don't want to use batteries, Nymira can be powered via USB-C using a standard wall power brick.

Important Notes

While Nymira is a perfomance instrument, it should also be handled with care.

Temperatures

Do not keep Nymira in a hot environment for any extended period of time, **especially a hot car**, or any environment near or over 49ºC/120ºF. Doing so risks damaging both the wood and the keys. Additionally, if Nymira is in a cold environment (below 4ºC/40ºF) for an extended period of time, it should be warmed up slowly, otherwise the wood may crack. If you are familiar with handling acoustic, wooden instruments, treat Nymira with the same care that you would a violin, clarinet, or acoustic guitar.

Power

In a studio setting, powering Nymira directly from a computer will produce digital noise in the signal. This is a common fault of the Electro-Smith Daisy Seed microcontroller. To get the best while using USB-C for power, connect Nymira to a standard USB-C wall power brick that would typically be used to charge a smart phone.
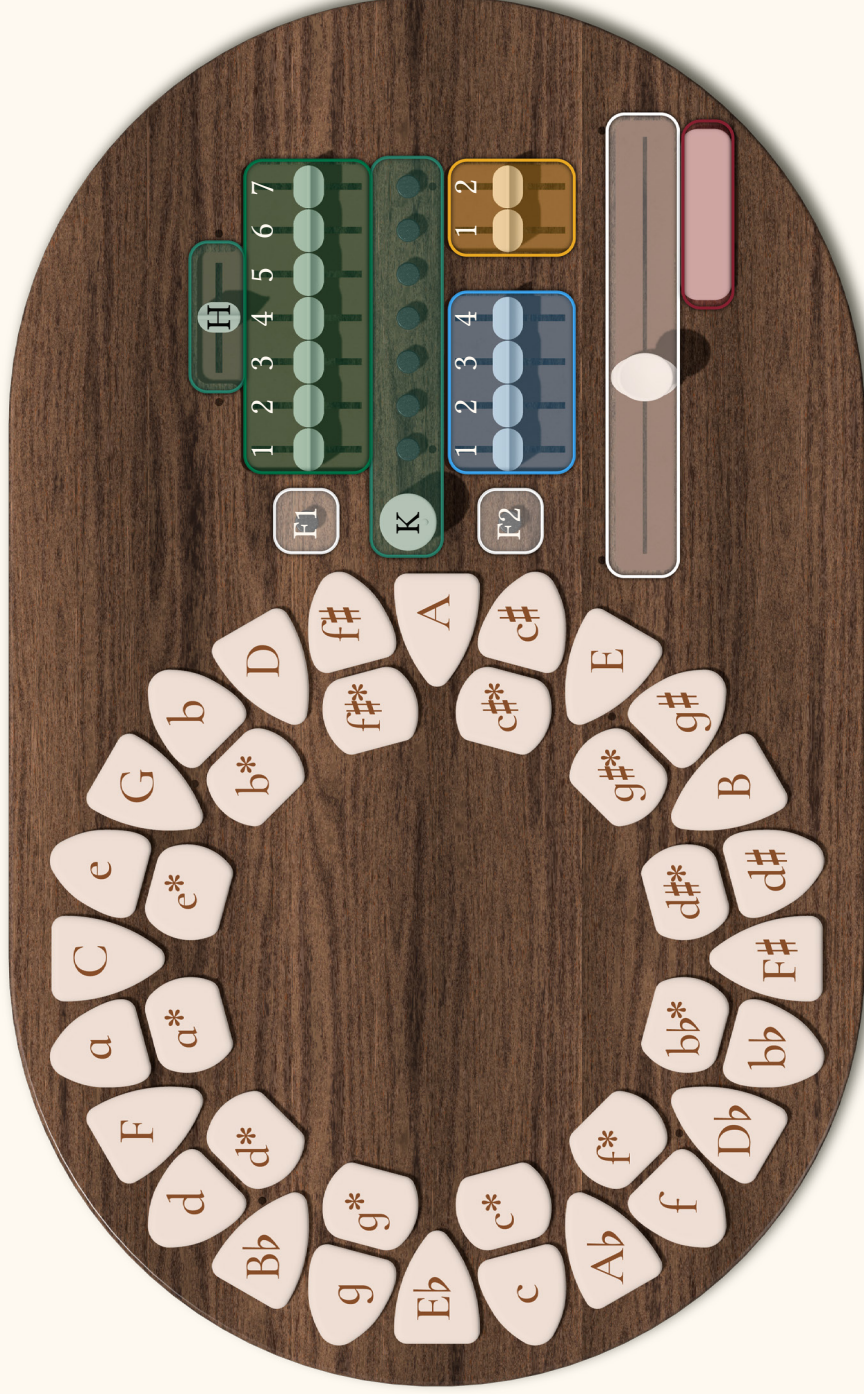
Batteries

Nymira can run on 4 rechargeable AA batteries. Please only use rechargeable NiMH batteries, and refrain from using standard alkaline batteries. Using rechargeable batteries also prevents the wastefulness of single-use batteries!

Enclosure

Please refrain from opening up the enclosure. There should not be a need to open the enclosure at all. Opening the enclosure will void your warranty.

Reference

Timbre Controls

	Additive	Subtractive	Granular
1	1st Partial	Tri Wave Amount	1st Partial
2	2nd Partial	PWM Wave Amount	2nd Partial
3	3rd Partial	Saw Wave Amount	3rd Partial
4	4th Partial	FM Wave Amount	4th Partial
5	5th Partial	FM Ratio Select	Spray
6	6th Partial	PWM LFO Speed	Grain Size
7	7th Partial	PWM LFO Depth	Jitter
H	Detune	Detune	Detune
K	FM Ratio	Transpose	FM Ratio

Filter Envelope

1	Attack Time
2	Cutoff Freq.
3	Decay Time
4	Decay Slope

Reverb

1	Decay Time
2	Dry/Wet

Function Buttons

	F1	F2	F1 & F2
Press	Toggle Quantizer	Cycle Between **Play** Modes	Cycle Between **Synth** Modes
Hold	Cycle Between **Strum** Modes	Toggle Open/Close Voicing	

Inputs, Outputs, and Switches

Speaker Switch

Turns the internal speakers on or off.

Main Power Switch

Three-way switch. USB Power, Battery Power, or Off (Middle)

ON OFF   USB OFF BAT

USB-C Port

For both powering the instrument (4v - 17v only. Do not exceed 17 volts), and for MIDI Out.
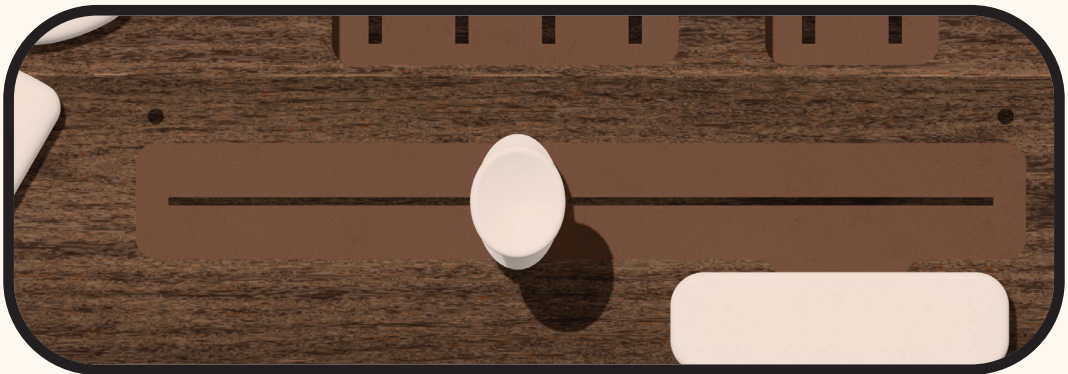
Stereo Audio Output

TRS Jack for high quality Audio Out.

Manual Arpeggiator

The core of Nymira centers around the manual arpeggiator. This large slider allows the user to treat Nymira as if it were a guitar or harp-like instrument. Pressing chord buttons and "strumming" the arpeggiator left and right triggers only the notes that are in the specified chord throughout the entire range of the instrument.

The arpeggiator is optimized to allow the user to strum at many different speeds and to quickly leap to different sections of the range without playing all of the notes in between. The user can briskly jump from one zone of the arpeggiator to another and Nymira will recognize this and only play the note that the user jumps to. This allows the user to play complex musical textures throughout the entire available range.
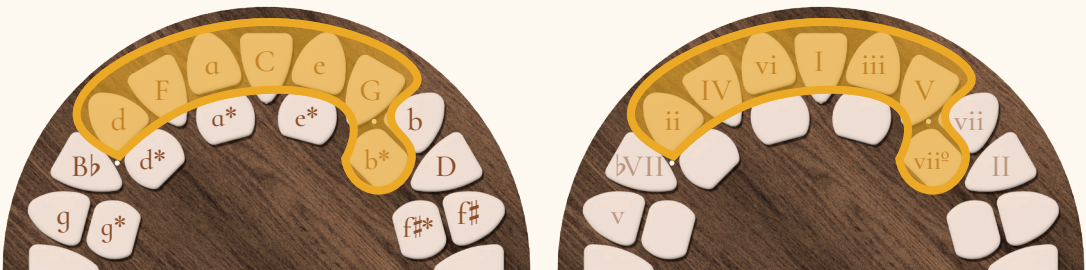
The most fundamental workflow of Nymira is to press and hold a chord button with your left hand, and move the arpeggiator with your right hand to strum through the chord.

Chord Buttons

Major and minor triads are located on the outer ring of the circle. Pressing one of the large, inward-facing triangle buttons will play a major triad. Pressing one of the smaller, outward-facing triangle buttons will play a minor triad. Star * keys are located in the inner ring. The function of these keys change based on what other buttons are being pressed. Any star key pressed by itself will yield a diminished triad. Pressing both a minor triad key and the star key below it will convert the minor triad into a major triad.

Nymira's button layout reflects the Circle of Thirds, an offshoot of the Circle of Fifths that places alternating major and minor triads with roots displaced by thirds into a 24-unit cycle. Doing so yields a layout that puts all of the diatonic triads in a musical key side by side.

Both the Circle of Thirds and the Circle of Fifths are isomorphic layouts, meaning that any chord progression on Nymira will have identical button combinations in every major and minor key.

Extensions

Start by picking a simple major or minor chord, then extend it by adding chords in a clockwise direction.

$$C \text{ major} + E \text{ minor} = CEGB = C^{maj7}$$

$$C \text{ major} + G \text{ major} = CEGBD = C^{maj9}$$

$$C \text{ major} + B \text{ minor} = CEGBDF\sharp = C^{maj9(\sharp 11)}$$

Any major chord played with its clockwise-adjacent diminished chord will yield a dominant seven chord.
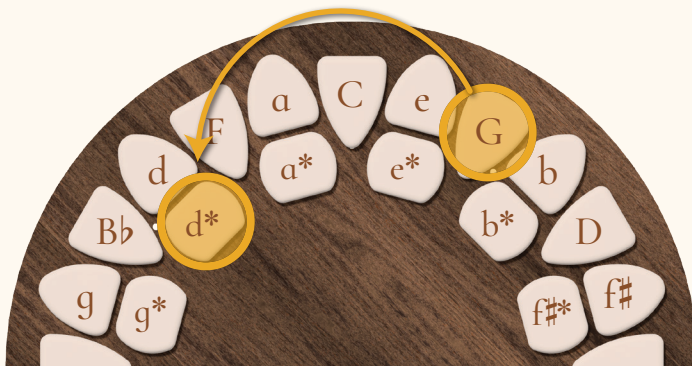
$$G \text{ major} + B \text{ diminished} = GBDF = G^{7}$$

Special Combinations

More complex and chromatic extensions are possible as well.

G major + D minor = GBDFA = G^9

G major + D diminished = GBDFA$\flat$ = $G^{7(\flat 9)}$

Special Combinations

The * buttons are not just diminished triad buttons. Playing a minor chord and the corresponding * button will change the minor chord into a major chord. This allows for very common diatonic modal mixture. Playing a major chord with its counter-clockwise adjacent * button will produce a sus2 chord.

E minor + e* = EG♯B = E major

E minor + e* + G major = EG♯BD = E⁷

G major + e* = GAD = G^{sus2}

G major + e* + D major = G^{sus2} + D^{sus2} = GDAE

Shift Button

Nymira allows you to play any chord with the shift button. When the shift button is pressed, all of the chord buttons only play their root notes. This gives you the opportunity to build any complex chord note by note.
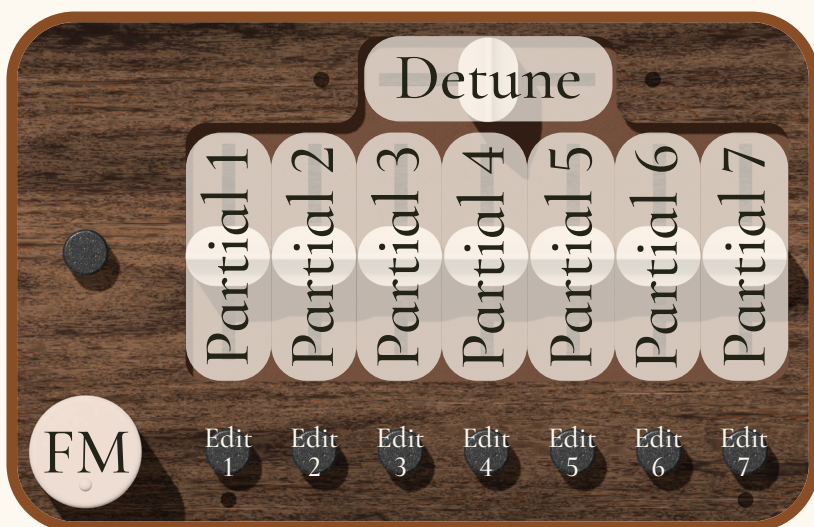
SHIFT + CDEF# = Whole Tone Subset

Additive Mode

Nymira has three unique synth modes. The default mode is *Additive Mode.* In this mode Nymira gives you individual access to the first seven partials of the overtone series, allowing you to change their respective amplitudes with the row of seven vertical sliders.

By default, each partial is a sine wave, but each of these partials can be individually frequency-modulated. Pressing and holding the black button below any of the seven sliders will temporarily allow you to edit that specific partial. While holding the black button, turning the knob to the left will cycle through eight different common FM ratios, drastically altering the timbre of that partial. Individually modulating multiple partials creates a very clangorous, bell-like timbre.

In addition to frequency modulation, you can also individually detune each partial. Press and hold the black button under a selected partial, and move the horizontal slider above to detune the partial either up or down.

Subtractive Mode

*cycle through the three different modes by pressing **both** function buttons at the same time.*

Nymira's *Subtractive Mode* is designed to be reminiscent of vintage analog synthesizers.

In Subtractive Mode, the first four sliders act like a mixer for four waveforms: Triangle, Pulse-Width Modulated Square, Saw, and Frequency-Modulated Sine waves. The fifth slider selects between eight different FM ratios for the sine wave oscillator. The sixth and seventh sliders control the pulse-width modulation, with slider 6 controlling the speed of the modulation, and slider 7 controlling the depth.

Similar to Additive Mode, pressing and holding the black button below any of the four oscillator sliders will allow you to change certain parameters. The horizontal slider above will detune the oscillator in the same way as in Additive Mode, and turning the knob to the left will transpose the oscillator either -12 semitones, 0, +12, +17, +24, or +31 semitones.
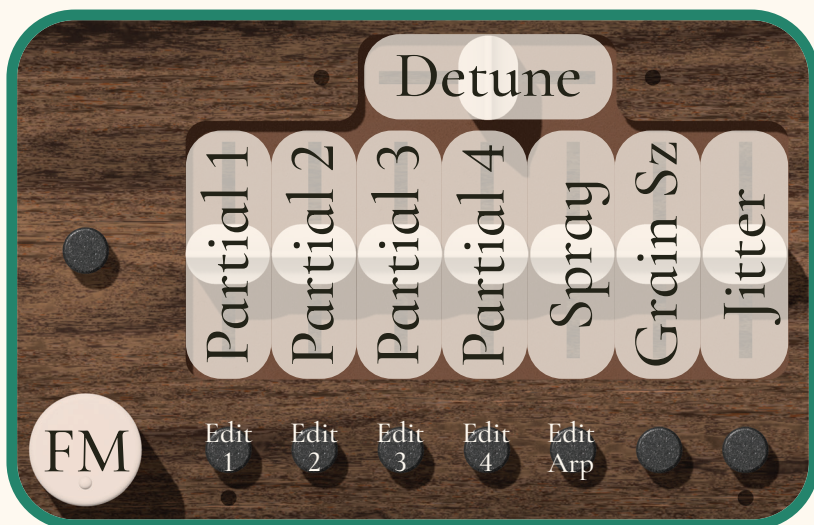
Granular Mode

*cycle through the three different modes by pressing **both** function buttons at the same time.*

Nymira's *Granular Mode* acts as an arpeggiator/granulator hybrid for creating harmonic textures.

In *Granular Mode*, the first four sliders are identical to the first four sliders in *Additive Mode*, allowing you to create a custom waveform from the first four partials of the overtone series. These partials can be edited in the same way as well.

Sliders 5-7 control how the granulation works, with slider 5 controlling how many notes are played through at a time ("spray"), slider 6 controlling the speed at which notes are played ("grain size"), and slider 7 controlling the amount of randomization of the speed/grain size ("jitter").

By default, notes play in a random order. Pressing and holding the edit button underneath the "Spray" slider will allow you to select different arrangements with the knob to the left.

Function Buttons

Nymira has two Function Buttons that house many different features. For each button, different operations happen when you press quickly versus when you press and hold the button for around one second.

Top Function Button

Toggle Quantization (Press): The Quantizer button limits the notes produced by strumming to a specific tempo. The tempo is changed by turning the same knob that is used to select the FM ratios for the timbre controls

Change Strum Modes (Press and Hold): There are two strum modes. The default mode senses when you move the arpeggiator quickly, and will skip notes, allowing you to strum in the same direction multiple times, or to play specific notes in any pattern. Pressing and holding the top function button will toggle this feature on and off.

Bottom Function Button

Change Play Mode (Press): There are three unique Play Modes: Immediate Trigger Mode, Bass Line Mode, and Arpeggiator-Only Mode.

> Immediate Trigger Mode is the default when Nymira powers on. When the user presses a chord button or multiple chord buttons, that chord is played. The user can additionally move the arpeggiator to play more notes in the chord. The voicing of the chord that is triggered is based on the location of the arpeggiator when the chord button is pressed.

> Bass Line Mode plays a lower single bass tone when a chord is initiated. The bass line in this mode is optimized to avoid awkward leaps, and its range shifts based on the progression of chords that are played.
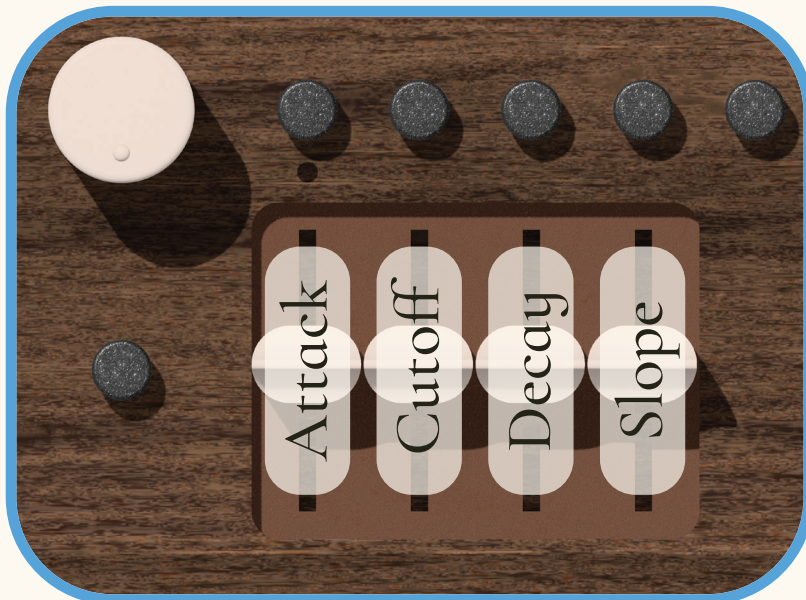
> Arpeggiator-Only Mode gives the user full control of each note being played by moving the arpeggiator. Pressing a chord button will not play any notes; only moving the arpeggiator produces sound.

Change Voicing Type (Press and Hold): There are two voicing types that Nymira is capable of. The default voicing allows you to play through every note in the selected chord in "close position", where no notes are skipped. Pressing and holding the bottom function button will change the voicings to "open position", which allows for new voicings like Drop 2.

Filter Envelope

Nymira has a unique two-stage (AD) filter envelope interface. The left-most slider controls the attack length—from very short and plucky, to a very long onset. The second slider controls the global cutoff frequency—the frequency that the attack stage will reach. Because the envelope controls the amplitude and the filter together, this slider acts also like a global lowpass filter cutoff control. The third fader controls the decay length, and the fourth fader controls the slope of the decay—from extremely exponential to linear.

In practice, you will find that the decay and slope sliders work together in a unique way. The dedicated slope slider allows you to control how fast the higher frequencies die out while the lower frequencies continue to ring. This creates a pseudo-lowpass gate sound throughout the instrument.
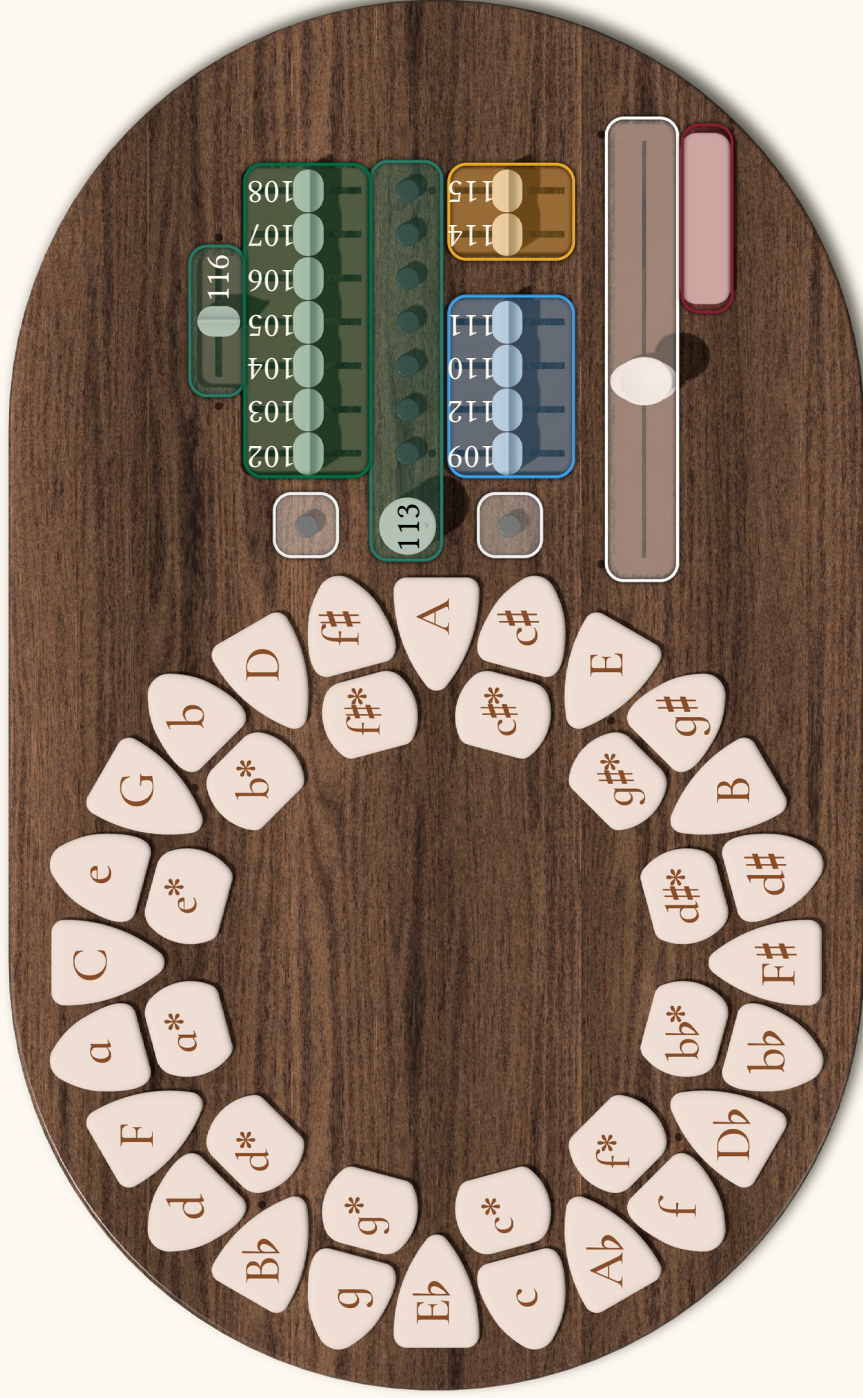
Reverb

Nymira has a simple built-in reverb effect with two controls: Decay time (left) and Dry/Wet mix (right).

USB MIDI CC Map

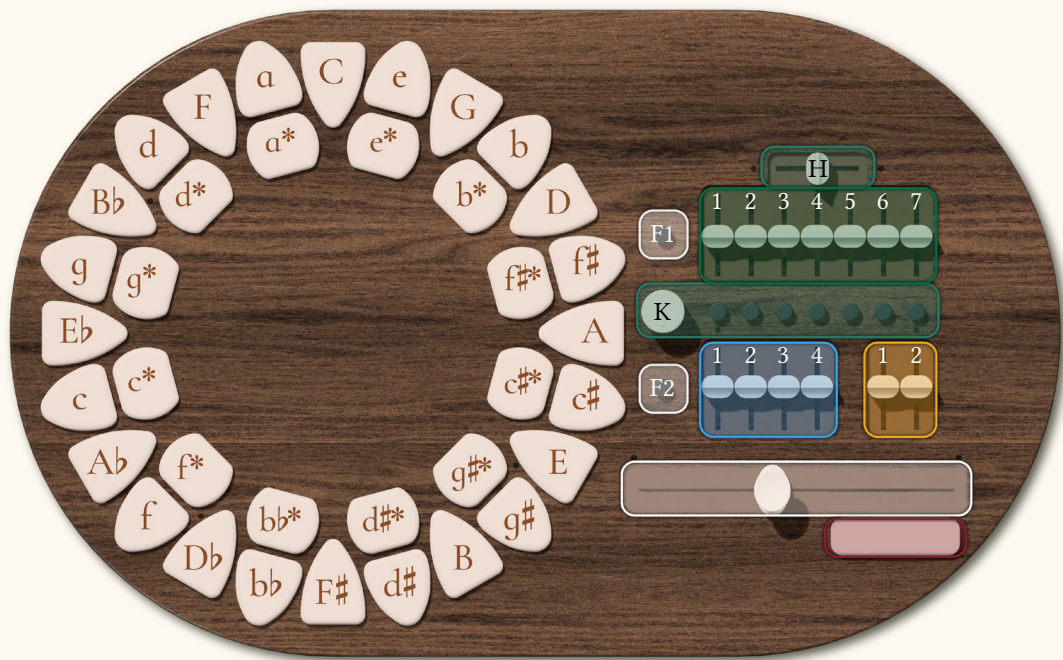# Any Questions?

I would love to answer them!

Text me at *(862) 200 - 7880*

Email me at *info@terraphones.com*

Thomas Adam Billings

Founder – Terraphones

Reference

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7	7th Partial	PWM LFO Depth	Jitter
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Reverb

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2	Dry/Wet

Function Buttons

	F1	F2	F1 & F2
Press	Toggle Quantizer	Cycle Between **Play** Modes	Cycle Between **Synth** Modes
Hold	Cycle Between **Strum** Modes	Toggle Open/Close Voicing	

USB MIDI CC Map

a C e
F a* e* G
d b
d* b*
Bb D
g f#* f#
g* A
Eb
c c* c#* c#
Ab g#* E
f* g#
f bb* d#*
Db B
bb F# d# g#

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102 103 104 105 106 107 108

113

109 112 110 111   114 115