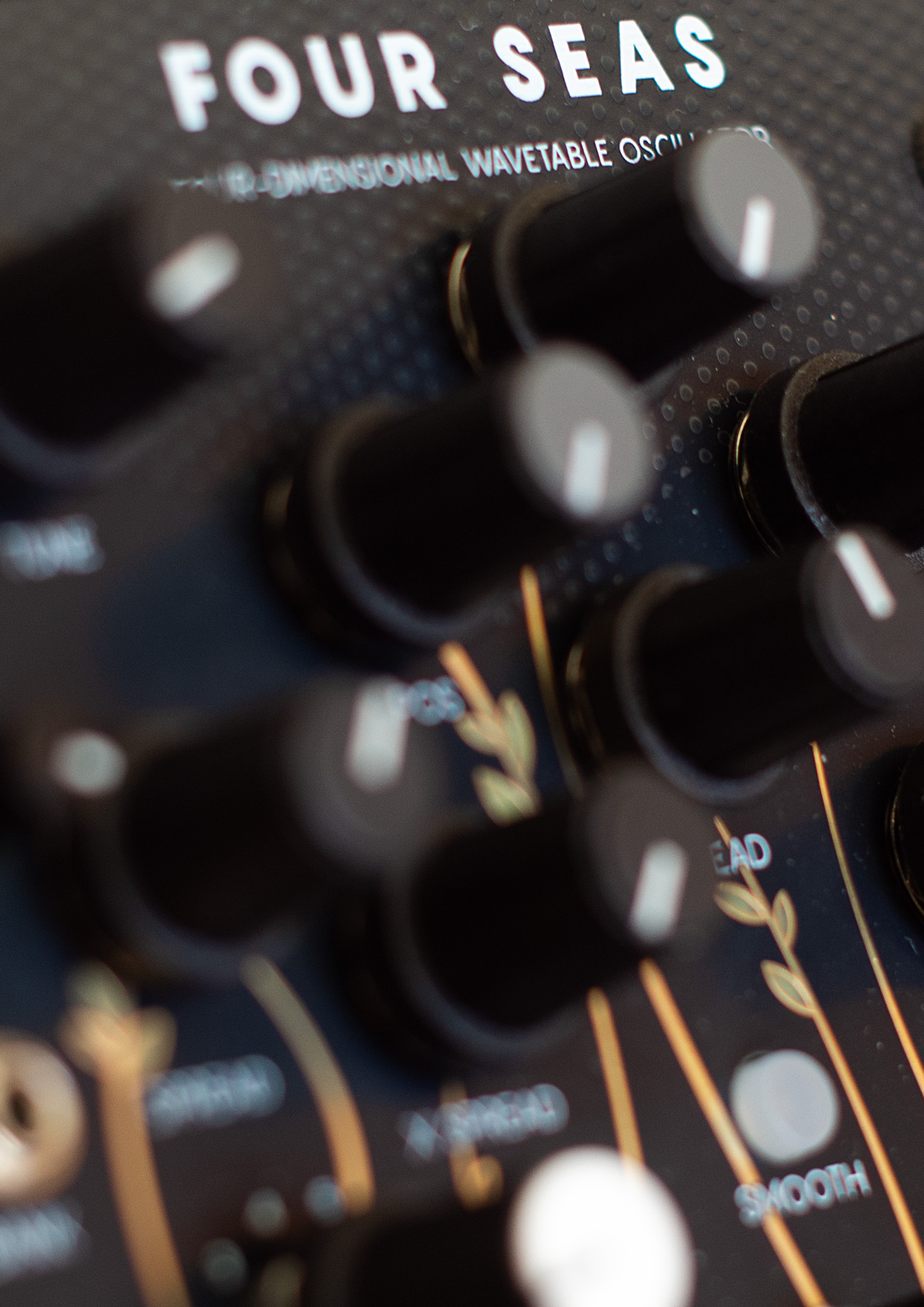


FOUR SEAS

3-DIMENSIONAL WAVETABLE OSCILLATOR





FOUR SEAS

FOUR-DIMENSIONAL WAVETABLE OSCILLATOR

Thank you for purchasing Four Seas,
the debut module for Ferry Island
Modular. We are glad you are here.



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Overview

Four Seas is a four-dimensional wavetable oscillator in Eurorack format. Its four related outputs inspire fun, creative patching, and happy accidents.

Width

26 HP

Depth

40 mm with power cable

Power

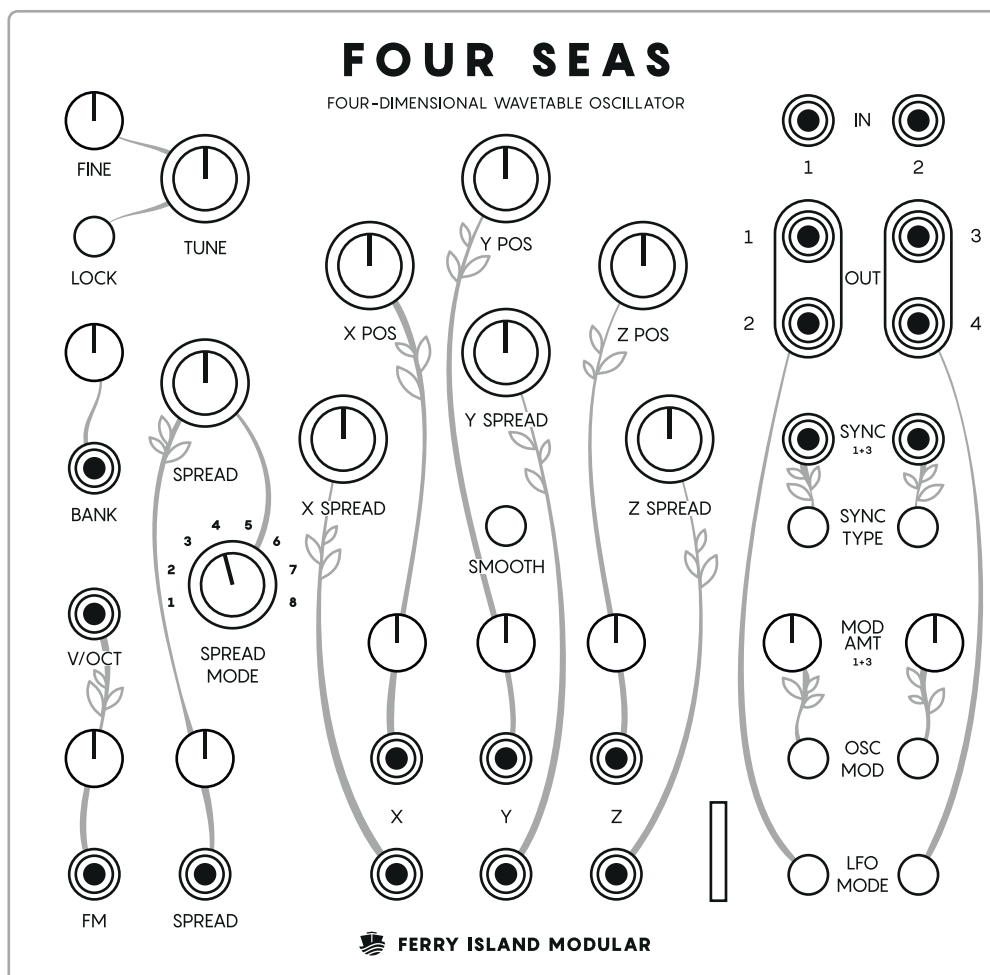
+12 V 220 mA, -12 V 50 mA

Four Seas has no screens, no presets, and minimal modes, making it an intuitive and playable instrument. Less RTFM and more music.

Expandability

- Audio output expansion port on the back
- I2C input and output ports on the back
- Open source firmware
- User wavetables can be created with our wavetable tool Harbor.

📄 Visit ferryislandmodular.com for more information.



Installation

To install Four Seas into your Eurorack modular system,

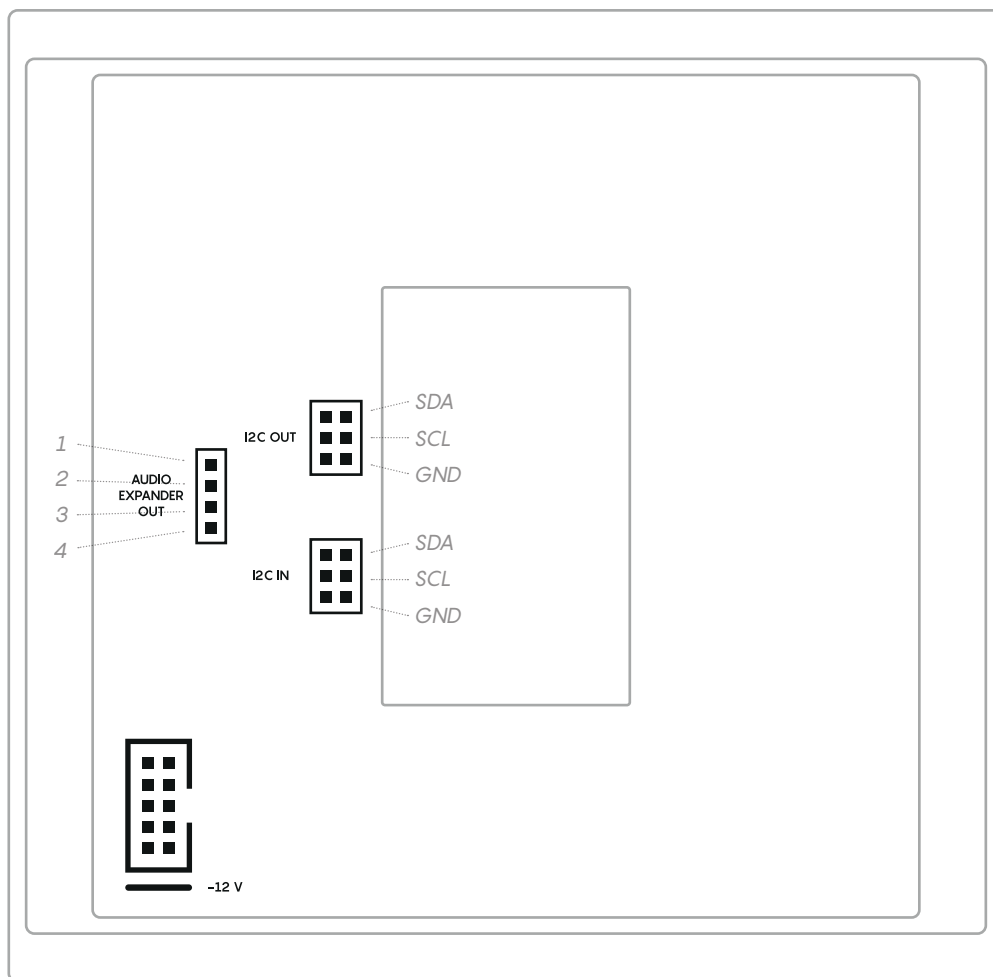
1. make 26 hp of room in your rack,
2. make sure your system is turned off, and
3. connect your Four Seas and the power distribution bus board or flying bus board of your case with a 16-pin to 10-pin power cable.

The power cable slot on Four Seas is in the bottom left corner of the back of the module. The keyed slot ensures that you can plug in the cable only one way, negative 12 volts (red stripe on the cable) towards the bottom edge.

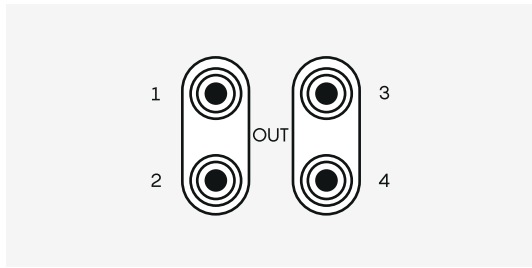
If you want to send the four outputs of Four Seas to another compatible device behind the panel, you need to connect the audio expander out headers of Four Seas to the input headers of another device. These simply replicate the same signals that are sent out of the front outputs 1-4.

If you want to use the I2C features of Four Seas, you need to connect the I2C headers of Four Seas to another I2C-compatible device. You need to connect the top pair to SDA, the middle pair to SCL and the bottom pair to GND. Incoming connections use the I2C IN headers and outgoing connections use the I2C OUT headers.

Visit page 11 to learn more about the I2C features of Four Seas.



Connections



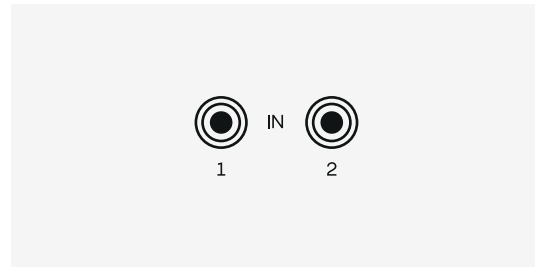
Audio outputs

Four Seas has four independent audio outputs, arranged in pairs of 1-2 and 3-4. Each pair can be used as an audio rate or LFO rate pair of outputs.

ⓘ Please refer to page 9 for more information on LFO mode.

CV inputs

Four Seas has 12 CV inputs for controlling its features with control voltage. You can read more about each under their respective features.



Audio inputs

Four Seas has two audio inputs for oscillator modulation purposes. Input 1 is normalised to input 2 when nothing is patched into input 2.

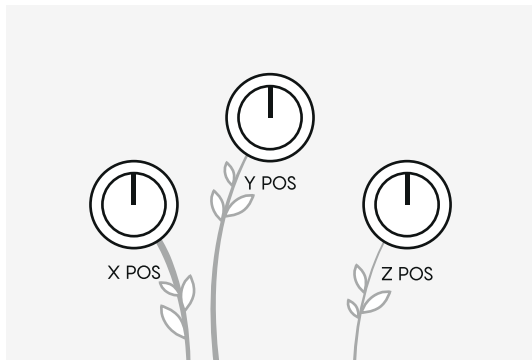
ⓘ Please refer to page 8 for more information on oscillator modulation.

Expansion ports

Four Seas has an audio output expansion port on the back of the module. It is meant for a future expansion module, but feel free to use it for your own explorations. Four Seas also has I2C input and output ports on the back of the module for interfacing with other I2C-compatible modules.

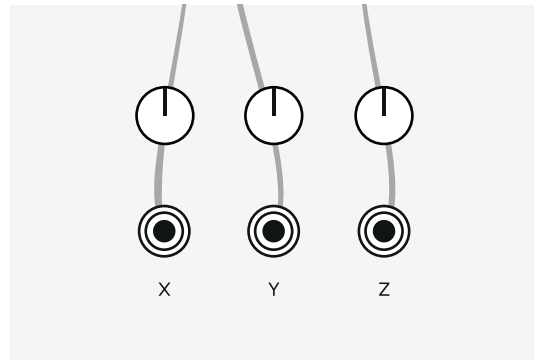
ⓘ Please refer to page 11 to learn more about the I2C features of Four Seas.

Navigating the wavetable



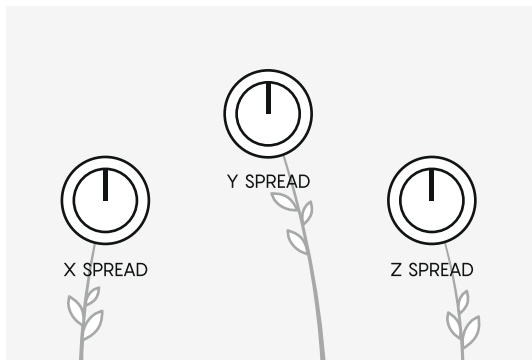
Wavetable position

X POS, Y POS, and Z POS define a position inside a three-dimensional wavetable space, in a coordinate cube of 8 by 8 by 8. These act as offsets to incoming CV.



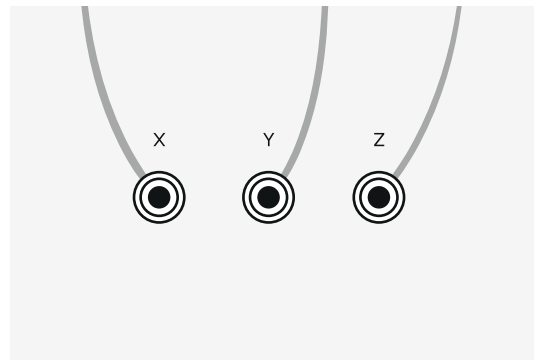
CV control over position

X POS, Y POS, and Z POS have corresponding CV inputs with attenuverters. The resulting CV values are visualized with LEDs and added to the X POS, Y POS, and Z POS knob values. The expected voltage range is -8 V to +8 V.



Wavetable spread

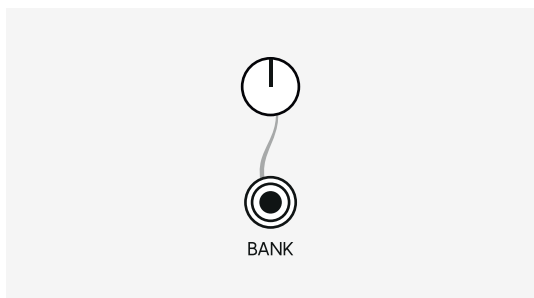
X SPREAD, Y SPREAD, and Z SPREAD control the spreading of wavetable position. This gives three additional wavetable positions relative to the main position. All four positions are then sent to their individual outputs.



CV control over spread

X SPREAD, Y SPREAD, and Z SPREAD have corresponding CV inputs. The CV values of the inputs are visualized with LEDs and added to the X SPREAD, Y SPREAD, and Z SPREAD knob values. The expected voltage range is -8 V to +8 V.

Selecting wavetables



Wavetable banks

BANK selects from up to twelve banks of wavetables i.e. twelve three-dimensional wavetable spaces.

CV control over bank

BANK has a corresponding unipolar CV input. The CV value is added to the BANK knob value. The expected voltage range is -8 V to $+8\text{ V}$.

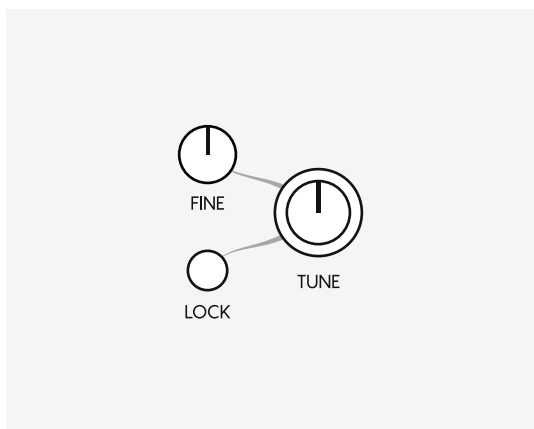
Download

Wavetables

Wavetable sets can be downloaded from the Ferry Island Modular web page. Users can later create their own wavetable sets using Harbor, our wave tool.

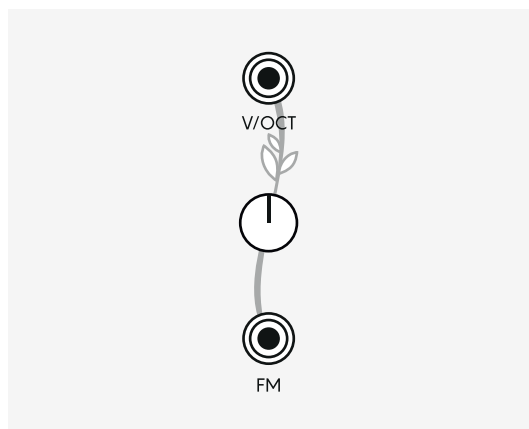
Visit ferryislandmodular.com for more information on wavetable specifications.

Tuning, pitch, and FM



Tuning

Four Seas has controls for coarse and fine tuning of the main pitch of the oscillator. Tuning can be locked with the LOCK button, to prevent unwanted adventures in pitch. You can cycle through octaves by holding LOCK and pressing LFO MODE buttons (left is down and right is up).



Pitch and FM

Four Seas has a V/OCT input for 1 volt per octave pitch control, tracking 10 octaves. The linear FM input sends incoming CV or audio through an attenuverter into the pitch of the oscillator for frequency modulation. The expected voltage range for V/OCT is -3 V to $+7\text{ V}$ and -8 V to $+8\text{ V}$ for FM.

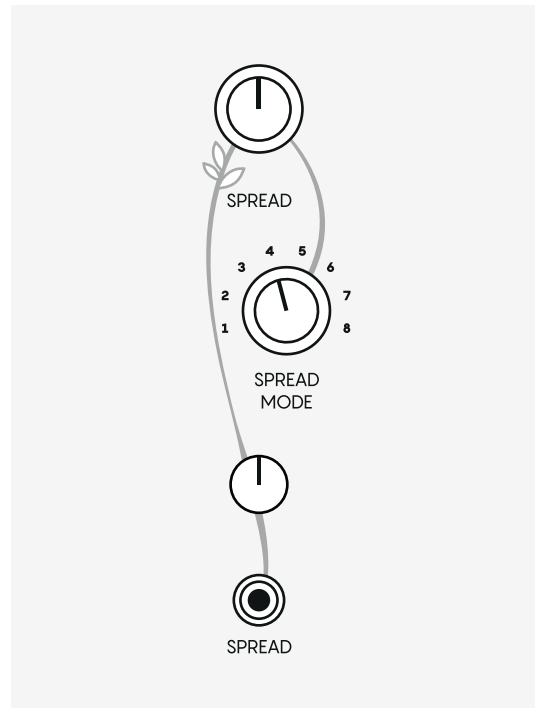
Frequency spread

Spread mode

The pitch of the oscillator can be spread into four individual pitches, sent to the four outputs. The SPREAD MODE rotary switch selects the ratio to be used in spreading those frequencies.

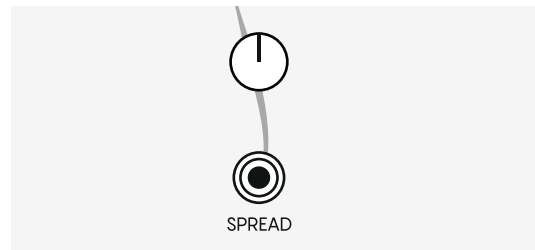
Four Seas has 8 spread modes:

1. Just intonation
2. Normal (sub)harmonics
3. Pythagorean tuning (fifths)
4. Subharmonic superparticular ratios
5. Fibonacci
6. Spectral $\sqrt{2}$
7. Golden ratio
8. Bohlen-Pierce tuning



Spread

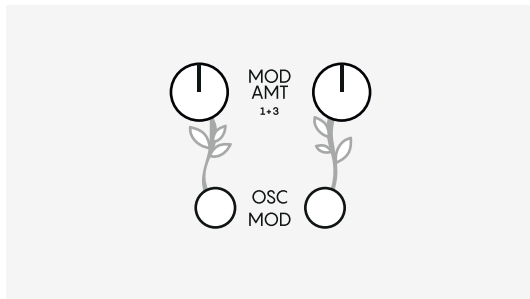
The bipolar SPREAD control sets the amount of frequency spread, based on the frequency ratio selected with SPREAD MODE. Fully counter-clockwise it gives subharmonics, around noon it introduces gentle detuning, and fully clockwise it gives upper harmonics.



CV control over spread

A CV signal sent into the SPREAD input goes through an attenuverter. The resulting signal is added to the value of the SPREAD knob and visualized by LEDs. The expected voltage range is -8 V to +8 V.

Oscillator modulation



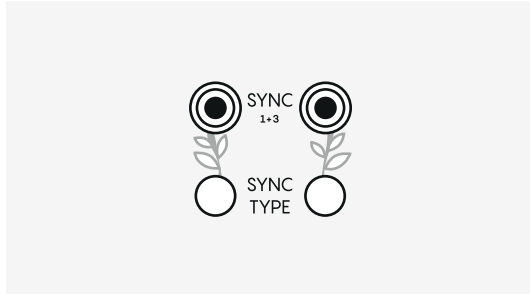
Oscillator modulation

Four Seas has two OSC MOD buttons, controlling how the signals coming into the audio inputs modulate the oscillator phase. The left OSC MOD modulates output 1 and the right OSC MOD modulates output 3. The adjacent MOD AMT knobs control the modulation amount.

Oscillator modulation types

Blue LED color is for traditional thru-zero phase modulation. Orange LED color is for phase-distortion waveshaping. Yellow LED color is for fixed-point scalar underflow, also known as FSU mode.

Oscillator sync



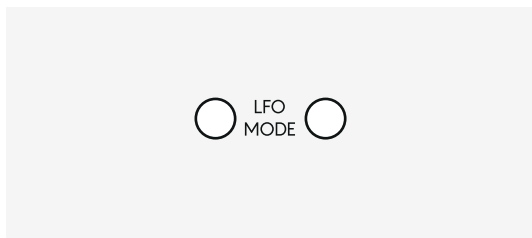
Oscillator sync

Four Seas has two SYNC TYPE buttons, controlling how the signals coming into the SYNC inputs sync the oscillator. The left SYNC input syncs output 1 and the right SYNC input syncs output 3.

Oscillator sync types

Blue LED color is for hard sync, or oscillator reset. Orange LED color is for soft sync, which also resets the oscillator, but only when the sync signal is received in the first fourth of the waveform (good for PLL-type effects). Yellow LED color is for flip sync, or waveshape reversal.

Oscillator modes



LFO mode

Four Seas has two LFO MODE buttons, controlling whether the output pairs give audible or low frequency signals. The left LFO MODE button controls the first output pair (1 and 2) and the right LFO MODE button controls the second output pair (3 and 4). The resulting LFO signals are still the same waveforms, resulting in coherent modulation elsewhere in a patch. By pressing the LFO MODE buttons, you can cycle through three frequency ranges for each side: normal, slow, and glacial.



Smooth

Four Seas has a SMOOTH button in the very center of the module. When it's switched on, Four Seas interpolates changes in wavetable position, resulting in waves that smoothly morph into each other. When SMOOTH is off, there is no interpolation, resulting in stepped transitions when changing position. SMOOTH does not affect BANK, which is always a stepped change.

Factory wavetable banks

Bank 1

Basic waveform building blocks.

Bank 2

Advanced harmonic structures with FM-like timbres.

Bank 3

Eight and sixteen bit inspired digital waveforms.

Bank 4

Linear feedback shift register digital tones.

Bank 5

Chaotic mathematical waveforms based on Lorenz attractors.

Bank 6

Waveforms inspired by vintage wavetable synths.

Bank 7

Waveforms spectrally derived from machinery samples.

Bank 8

Waveforms spectrally derived from vintage arcade samples.

Bank 9

Additive synthesis waveforms.

Bank 10

Waveforms optimized for wavefolding and PM.

Bank 11

Morphing waveforms.

Bank 12

Waveforms optimized for LFOs and modulation.

I2C functionality

From firmware 1.1.0 onwards, Four Seas has I2C features enabled for controlling it with another device on the I2C bus. This can be especially fun with modules such as Teletype or Crow by Monome.

The I2C address of Four Seas on the I2C bus of your system is **0x58** in hex and **88** in decimal.

① We prepared a special (unofficial) version of the Monome Teletype firmware, with direct Teletype operators for controlling Four Seas. See the appendix to this user guide in the resources section of the Four Seas product page for more info.

Continuous parameters

Position, spread, tuning, and mod depth parameters are **additive**, meaning the I2C value is summed with the knob position and CV input, then clamped to a valid range.

Toggle parameters

Sync, mod, LFO, smooth, and spread mode parameters are **direct-set**, meaning they override the button state when set.

Hex	Range	Effect at full scale (± 5 V)
0x00	s16V	X position offset ± 7.0
0x01	s16V	Y position offset ± 7.0
0x02	s16V	Z position offset ± 7.0
0x03	s16V	X spread offset ± 1.0
0x04	s16V	Y spread offset ± 1.0
0x05	s16V	Z spread offset ± 1.0
0x14	s16V	Frequency spread offset ± 1.0
0x09	s16V	Mod depth 1 offset ± 1.0 (clamped to 0-1)
0x0A	s16V	Mod depth 2 offset ± 1.0 (clamped to 0-1)
0x06	s16V (eq. temp.)	Pitch offset
0x0B	signed int8	Bank offset (additive, clamped 0-11)
0x30	-	Releases all I2C overrides to hardware-set values

Hex	Arguments	Description
0x20	osc, value	Per-osc pitch offset
0x21	osc, value	Per-osc X offset (0 = no offset, 8192 = +7.0, -8192 = -7.0)
0x22	osc, value	Per-osc Y offset (0 = no offset, 8192 = +7.0, -8192 = -7.0)
0x23	osc, value	Per-osc Z offset (0 = no offset, 8192 = +7.0, -8192 = -7.0)

Oscillators go from 0 to 3, oscillator 1 being 0 all the way to oscillator 4 being 3. All per-oscillator values are added to the corresponding global value.

Hex	Dec	Value range	Description
0x0C	12	0=HARD 1=SOFT 2=FLIP	Sync mode osc 1
0x0D	13	0=HARD 1=SOFT 2=FLIP	Sync mode osc 2
0x0E	14	0=PM 1=WS 2=XOR (FSU)	Mod mode osc 1
0x0F	15	0=PM 1=WS 2=XOR (FSU)	Mod mode osc 2
0x10	16	0=OFF 1=ON 2=SLOW 3=GLAC	LFO mode osc 1
0x11	17	0=OFF 1=ON 2=SLOW 3=GLAC	LFO mode osc 2
0x12	18	0/1	Wave interpolation
0x13	19	0-7	Freq spread type

Patching tips

1. Connect outputs 1 & 2 to your mixer or processing chain.
2. Use X POS, Y POS, and Z POS knobs to explore the wavetable space.
3. Patch a sequencer or keyboard volt per octave output to V/OCT.
4. Try out other banks with the BANK knob.
5. Explore spread modes with SPREAD MODE rotary switch and SPREAD knob.
6. Add modulation by patching an audio signal to an audio input, choosing OSC MOD types and exploring depth with MOD AMT knobs.
7. Explore subtle variations by adjusting X SPREAD, Y SPREAD, and Z SPREAD values with small movements.
8. Use LFO toggle to generate low frequency modulation sources.
9. Try turning off SMOOTH for stepped motion through the wavetable.
10. Experiment with different OSC MOD and SYNC TYPE choices for complex interactions.
11. Patch all outputs to individual low pass gates for quad pluck mayhem.
12. Explore feedback patching with the audio outputs and inputs.

Calibration

Your Four Seas module is factory calibrated and you should normally never need to recalibrate it. However, if you end up in a situation where recalibration is needed, visit ferryislandmodular.com for information on how to do it.

Support

Do you need help? Email your questions to support@ferryislandmodular.com

For information, downloads, and firmware updates please visit the Ferry Island Modular website at ferryislandmodular.com

Follow @ferryislandmodular on Instagram for news, patching tips and ideas.

Visit 'Ferry Island Modular' on Youtube for module tutorials, demos, and other related videos.

AD
DE

SMOOTH

SPREAD

X

Y

Z



FERRY ISLAND MODULAR