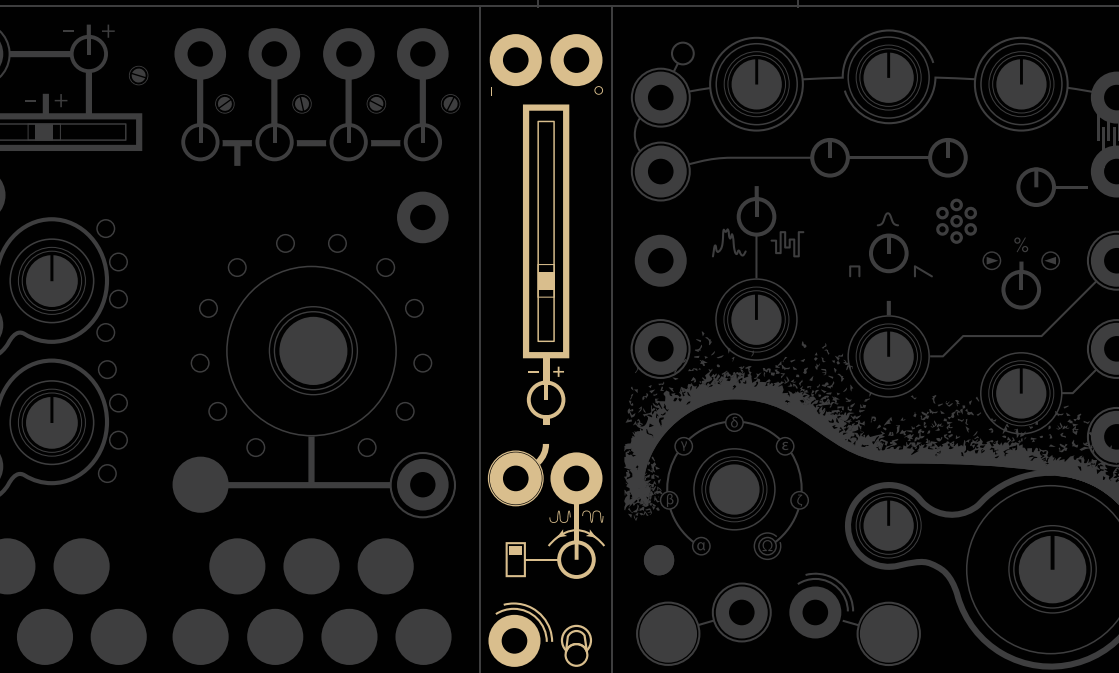
INSTRUŌ | SPECIALIST SYNTHESIZERS



athrú
Wavefolder
User Manual

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Description

The Instruō **athrú** is a full featured analogue wavefolder that creates incredibly complex timbres from very basic waveforms using an interesting form of distortion.

Unlike traditional distortion effects where signal amplitudes passing a threshold are 'clipped', wavefolding inverts signal amplitude when it passes an amplitude threshold. This folding can occur multiple times, resulting in dynamic control over rich harmonic spectra.

In subtractive synthesis, partials are attenuated from harmonically dense waveforms. **athrú**, on the other hand, utilizes additive synthesis by generating partials from harmonically simple waveforms.

Starting out as a derivative of the West Coast timbre circuit, the wavefolders in the Instruō system have been tweaked and adapted with each incarnation. **athrú** is the latest incarnation in a stand alone package.

Depth control via an exponential VCA, summing with a scalable symmetry bias offers everything from subtle boosts in harmonics to full on spectral devastation.

Features

- Wavefolding
- Symmetry bias with summing capabilities.
- Strike input with definable decay
- Analog drive

Installation

1. Confirm that the Eurorack synthesizer system is powered off.
2. Locate 4 HP of space in your Eurorack synthesizer case.
3. Connect the 10 pin side of the IDC power cable to the 2x5 pin header on the back of the module, confirming that the red stripe on the power cable is connected to -12V.
4. Connect the 16 pin side of the IDC power cable to the 2x8 pin header on your Eurorack power supply, confirming that the red stripe on the power cable is connected to -12V.
5. Mount the Instruō **athrú** in your Eurorack synthesizer case.
6. Power your Eurorack synthesizer system on.

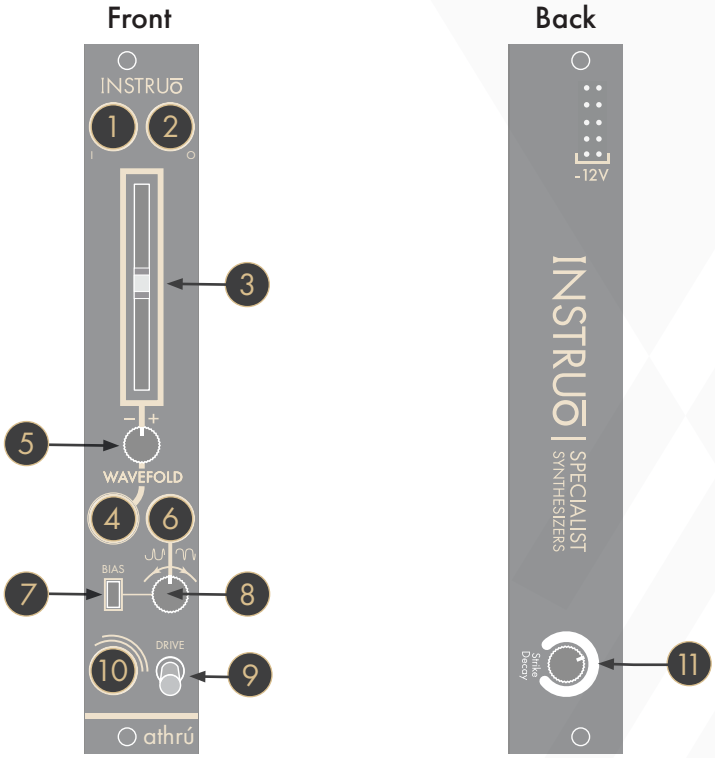
Note:

This module has reverse polarity protection.
Inverted installation of the power cable will not damage the module.

Specifications

- Width: 4 HP
- Depth: 39mm
- +12V: 30mA
- -12V: 30mA

athrú | ˈaːɾˠuː | **verb** (mathematics) an act or process through which something becomes different; to change, transform, alteration, variation and mutation



Key

1. Input
2. Output
3. Wavefold
4. Wavefold CV Input
5. Wavefold Attenuverter
6. Symmetry Bias Input
7. Symmetry Bias Switch
8. Symmetry Bias Attenuverter
9. Drive Toggle
10. Strike Input
11. Strike Decay

Wavefolding

Input: DC coupled signal input.

Output: DC coupled signal output.

Wavefold: The **Wavefold** fader controls the amount of wavefolding applied to the signal present at the **Input**. The folded signal is present at the **Output**.

- Moving the fader fully downwards will reduce the **Input** signal's amplitude, resulting in near-silence.
- Moving the fader fully upwards results in a rich, harmonic timbre (If the **Symmetry Bias Switch** is in the up position, adjusting the **Symmetry Bias Attenuverter** will further affect the harmonic spectrum).

Wavefold CV Input: The **Wavefold CV Input** is a bipolar control voltage input for the **Wavefold** parameter that utilises an exponential VCA.

- Control voltage is summed with the fader position following its inbuilt attenuverter.

Wavefold Attenuverter: The **Wavefold Attenuverter** will scale and invert the control voltage signals present at the **Wavefold CV Input**.

Symmetry Bias Input: A signal present at the **Symmetry Bias Input** will replace the normalled reference DC voltage. The external signal can be scaled and inverted via the **Symmetry Bias Attenuverter**. The incoming signal sums with the **Input** signal before reaching the wavefolding stage.

- External signals can be processed via the **Symmetry Bias Input**. The **Symmetry Bias Attenuverter** controls the external signal's amplitude. Decreasing the amount of wavefolding via the **Wavefold** fader will isolate only the secondary external signal at the **Output**.

Symmetry Bias Switch: The **Symmetry Bias Switch** changes the behavior of the **Symmetry Bias Attenuverter**.

Symmetry Bias Attenuverter: The **Symmetry Bias Attenuverter** can function in two ways depending on the position of the **Symmetry Bias Switch**.



When the switch is in the down position, the **Symmetry Bias Attenuverter** functions as an attenuverter for incoming control voltage or audio signals. This means that control voltage can be applied to the parameter or two audio signals can be summed together before reaching the wavefolding stage. Turning the knob anticlockwise will scale and invert the incoming control voltage or audio signal. Turning the knob clockwise will scale the incoming control voltage or audio signal.

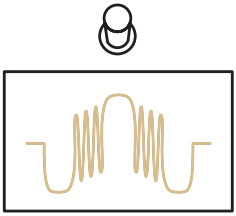


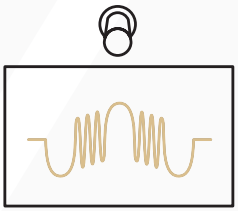
When the switch is in the up position, the **Symmetry Bias Attenuverter** controls the DC offset amount applied to the signal present at the **Input**. The amount of DC offset is applied before the wavefolding stage. Turning the knob anticlockwise applies a negative bias to the **Input** signal. Turning the knob clockwise applies a positive bias to the Input signal. Applied DC bias will affect the harmonic overtones of the waveform.

- The center position of this knob is calibrated to 0V.

Drive Toggle: Analog overdrive can be applied to the signal present at the **Input**, resulting in soft harmonic distortion.

- If the toggle is in the up position, overdrive is enabled. If the toggle is in the down position, overdrive is disabled.





Strike Input: A gate or trigger signal present at the **Strike Input** will momentarily activate the wavefolder.

Strike Decay: The decay of the **Strike Input** can be adjusted via the **Strike Decay** knob located on the back of the module.

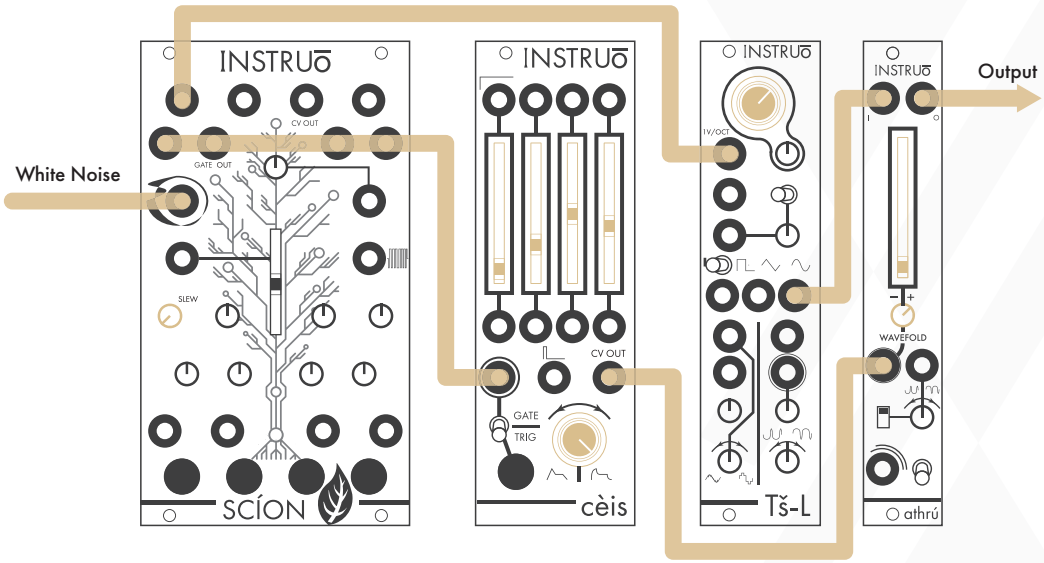
Turning the knob anticlockwise will decrease the decay time. Turning the knob clockwise will increase the decay time. The default position is 50%.



Patch Examples

West Coast Synth Voice:

Summary: The random voltage generator sends voltages to the oscillator while simultaneously triggering the envelope generator. The CV output of the envelope generator opens **athrú**, allowing the oscillator signal to pass through.



Audio Path:

- Connect the desired waveform of an oscillator to the **Input** of athrú.
- Monitor the output of the **athrú**.
- Set the fundamental frequency of the oscillator to a desired position.
- Set the **Wavefold** fader to its minimum setting.

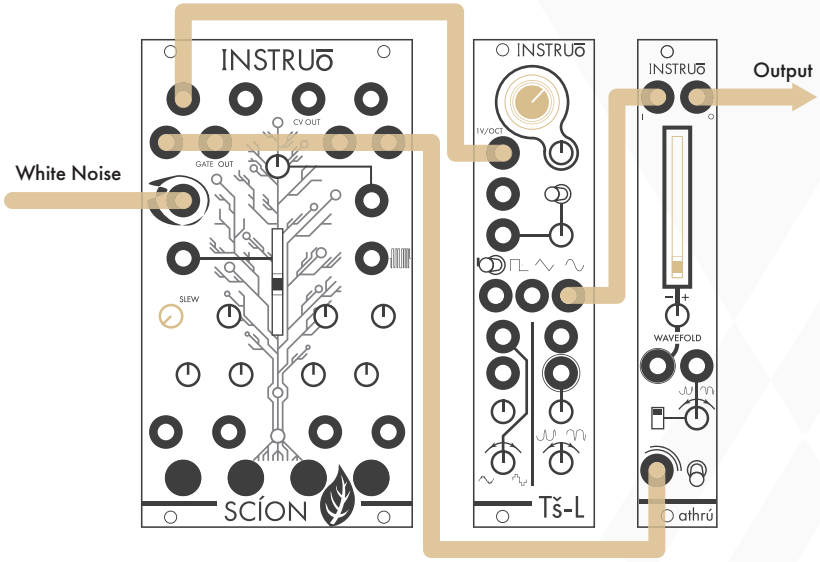
Control Path:

- Connect the stepped random output of a random voltage generator to the 1V/Oct input of the oscillator.

- Connect the gate output of the random voltage generator to the trigger input of an envelope generator.
- Connect the CV output of the envelope generator to the **Wavefold CV Input** of **athrú** and set the **Wavefold Attenuverter** to a desired positive position.
- Set the envelope stages to desired positions.

West Coast Bongo:

Summary: The random voltage generator sends voltages to the oscillator while simultaneously striking **athrú**, allowing the oscillator signal to pass through.



Audio Path:

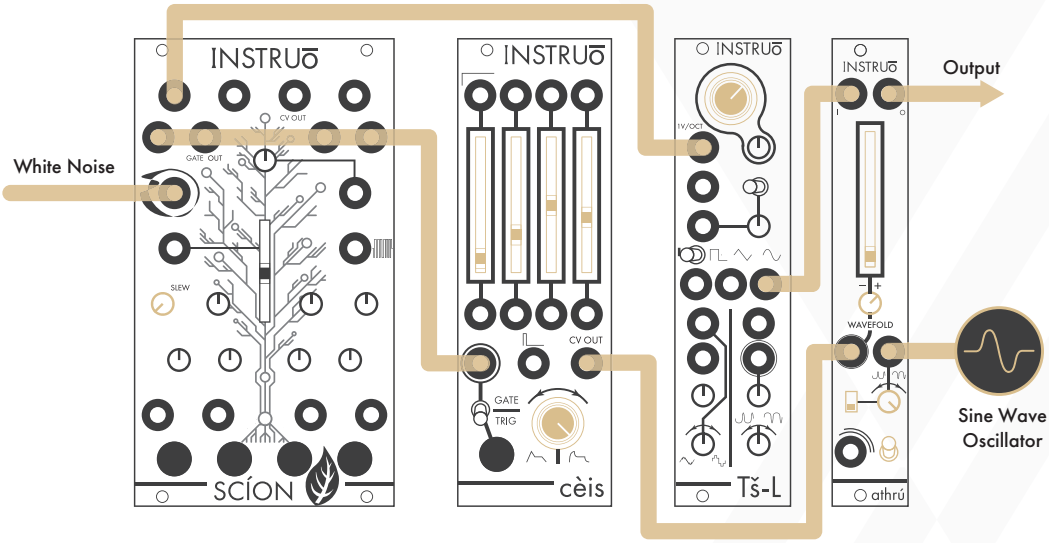
- Connect the desired waveform of an oscillator to the **Input** of **athrú**.
- Monitor the output of the **athrú**.
- Set the fundamental frequency of the oscillator to a desired position.
- Set the **Wavefold** fader to its minimum setting.

Control Path:

- Connect the stepped random output of a random voltage generator to the 1V/Oct input of the oscillator.
- Connect the gate output of the random voltage generator to the **Strike Input** of **athrú**.

Summed Wavefolder:

Summary: Two waveforms are summed via the **Input** and **Symmetry Bias Input** and then sent through the wavefolder.

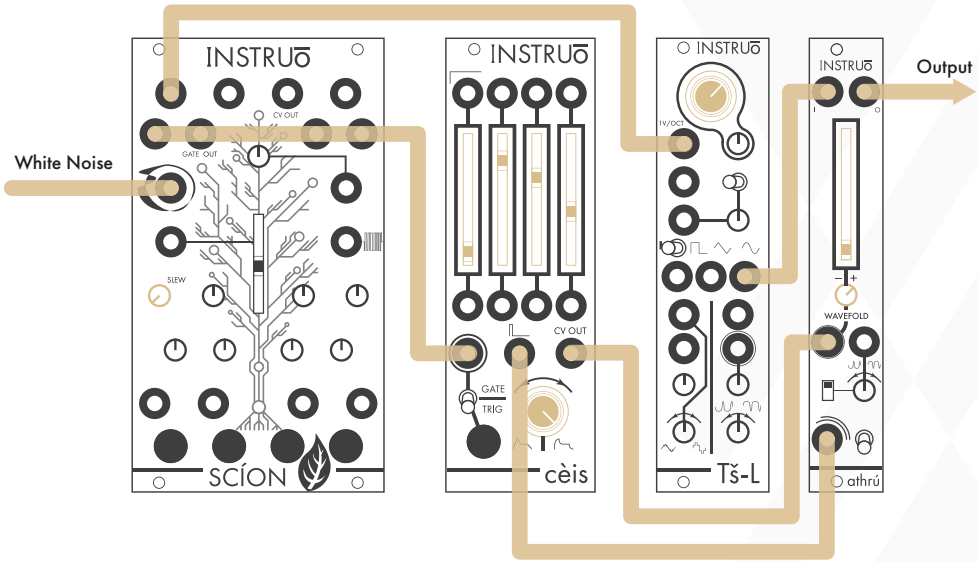


Audio Path:

- Create a **West Coast Synth Voice** audio path.
- Connect a desired waveform from a secondary oscillator to the **Symmetry Bias Input**.
- Set the **Symmetry Bias Switch** to the down position and set the **Symmetry Bias Attenuverter** fully clockwise.
- Set the **Drive** toggle to the up position for added distortion.

Burst Generator:

Summary: Everytime cèis is triggered, a burst of trigger signals will stike **athrú** allowing the oscillator signal to pass through. For added modulation, multiply the combined trigger output signal and connect it to both the **Strike Input** of **athrú** and the clock input of a random voltage generator and connect the CV output of the random voltage generator to the 1V/Oct input of the oscillator.



Audio Path:

- Create the **West Coast Synth Voice** audio path.

Control Path:

- Connect the combined trigger output of cèis to the strike input of **athrú**.
- Set the separate envelope stages at different positions to create the desired trigger burst.
- Trigger cèis via the Gate/Trig Input or the Gate/Trig Button.

Manual Author: Collin Russell
Manual Design: Dominic D'Sylva

CE This device meets the requirements of the following standards: EN55032, EN55103-2, EN61000-3-2, EN61000-3-3, EN62311.