



INSTRUO tanh 3 Waveshaper Modular User Manual

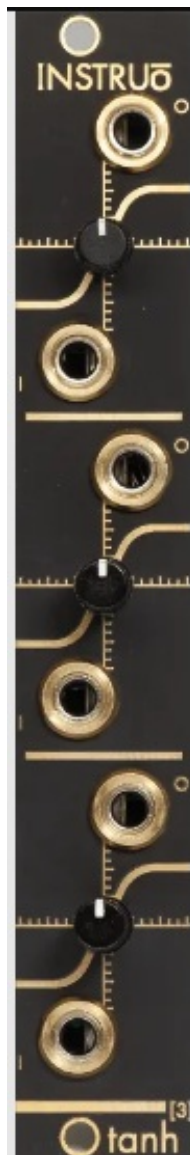
[Home](#) » [INSTRUO](#) » INSTRUO tanh 3 Waveshaper Modular User Manual 

Contents

- [1 INSTRUO tanh 3 Waveshaper Modular](#)
- [2 Description / Features](#)
- [3 Description](#)
- [4 Features](#)
- [5 Installation](#)
- [6 Specifications](#)
- [7 Patch Examples](#)
- [8 Resulting Waveshapes](#)
- [9 Limiter/Distortion](#)
- [10 Feedback Control](#)
- [11 Documents / Resources](#)
- [12 Related Posts](#)



INSTRUO tanh 3 Waveshaper Modular



Description / Features

The Instru **tanh[3]** is a three-channel waveshaper, limiter, overdrive, and feedback controller. Each channel takes a signal input and outputs the hyperbolic tangent function ($\tanh(x)$) for that input signal. The **tanh[3]** adds curves to signals, producing tangential distortion which is a form of soft clipping. It can be used to limit signal amplitude, add warm overdrive, and shape raw waveforms by softening or adding harmonic content based on input amplitude.

Description

The Instruō **tanh[3]** is a three channel waveshaper, limiter, overdrive, and feedback controller. Each channel of the **tanh[3]** takes a signal input and outputs the hyperbolic tangent function ($\tanh(x)$) for that input signal.

- In more musical terms, tangential distortion is a form of soft clipping which can produce signal amplitude limiting via analogue waveshaping. Driving a hot audio signal into it will add warm overdrive. Raw waveforms will be subtly shaped; softening or adding harmonic content based on input amplitude.

Understanding what the **tanh[3]** does to a signal, both mathematically and sonically can be hard to explain, but it essentially adds curves to signals.

For many Max/MSP and/or PD users, the `[tanh~]` object may be familiar and is likely a much used secret weapon in many contexts.

Features

- Wave shaper
- Limiter
- Distortion
- Feedback control
- identical independent channels with normalling

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 2×5 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 2×8 pin header on your Eurorack power supply, confirming that the red stripe on the power cable is connected to -12V.
5. Mount the Instruō tanh[3] in your Eurorack synthesizer case.
6. Power your Eurorack synthesizer system on.

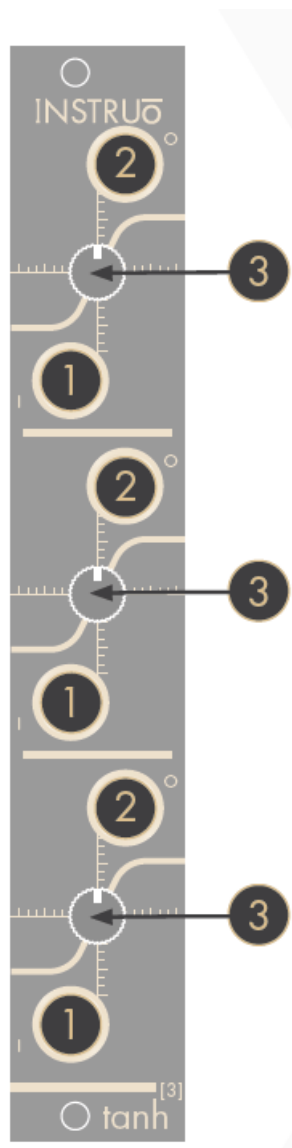
Note

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

Specifications

- Width: 4 HP
- Depth: 27mm
- +12V: 15mA
- 12V: 10mA

tanh[3] | tʃnt | noun (mathematics) the hyperbolic tangent of (x); or as a verb... “a’m gonna tan-h that”



Key

1. Inputs
2. Outputs
3. Level

There are three channels of identical $\tanh[3]$ circuits.

Input: Signal input.

- DC coupled input for audio or control voltage signals.

Output: Signal output.

- DC coupled output for audio or control voltage signals.

Level: Input signal level.

- Moving the knob clockwise will increase the amount of waveshaping.

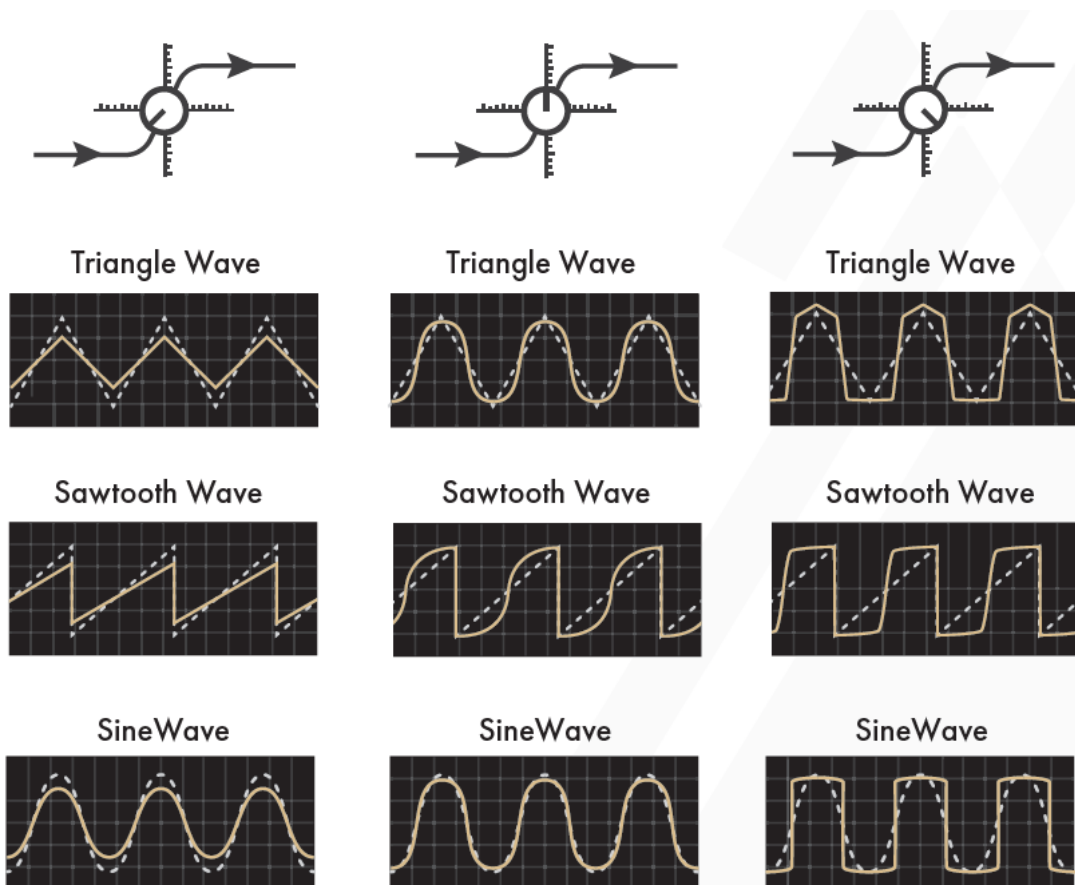
It is important to note that the top channel normals down to the middle channel and the middle channel normals down to the bottom channel. Plugging out from any channel's output breaks its normal.

Patch Examples

Waveshaping

- Patching a triangle waveform through $\tanh[3]$ will allow for some interesting wave shape control.
- When the Level knob is fully anticlockwise, the resulting signal will be a slightly attenuated triangle wave.
- As the Level is increased, the corners will soften and the waveform will shape into a sine waveform.
- At higher levels, the sine waveform will soft clip and eventually settle into a unique pentagon waveform.

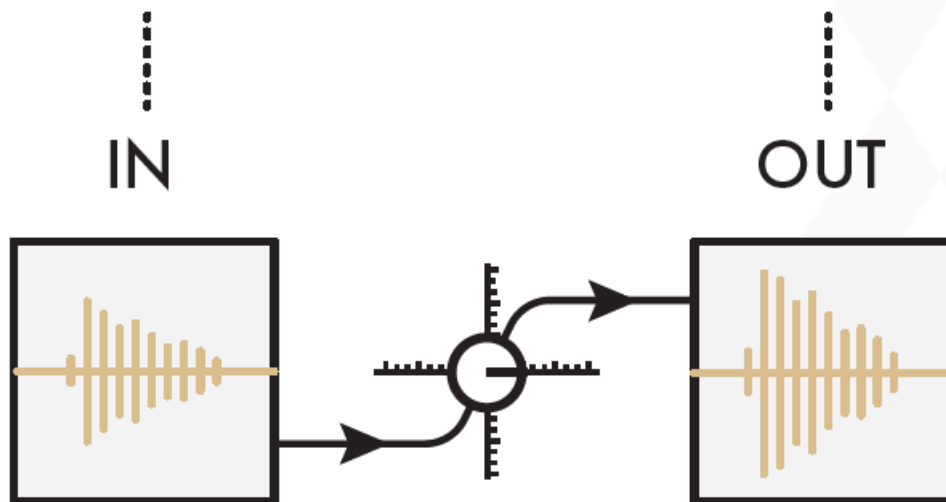
Resulting Waveshapes



Limiter/Distortion

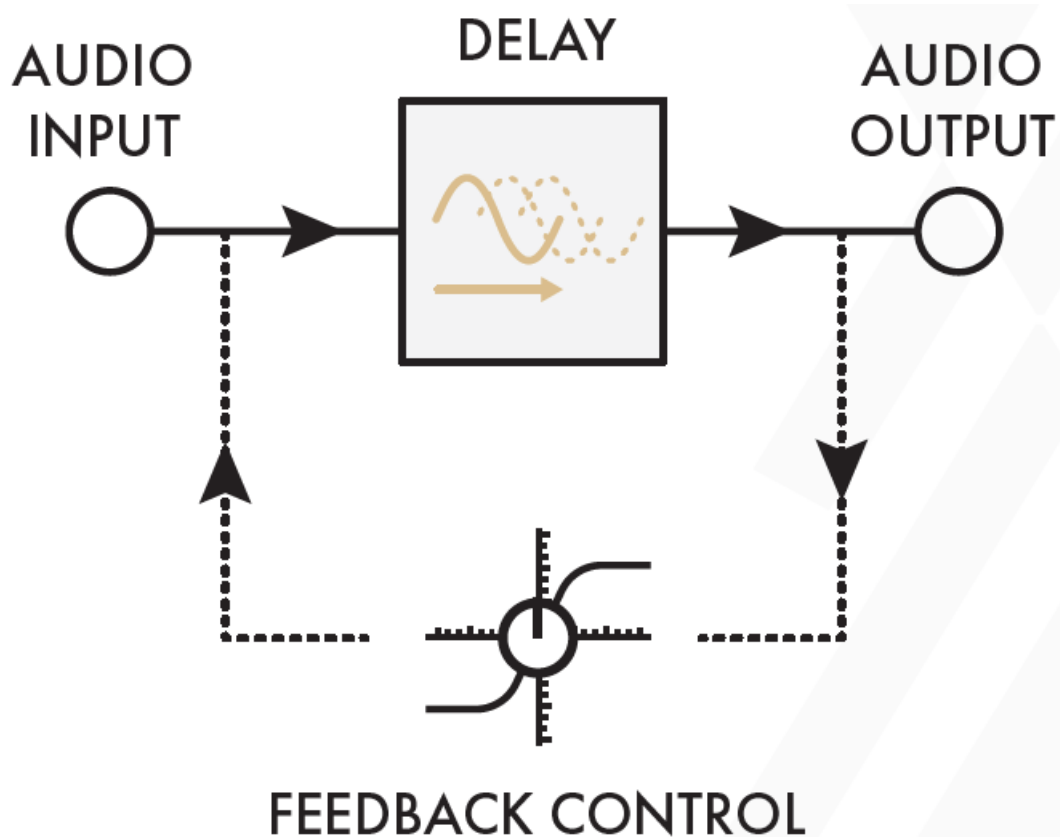
- Patching complex audio signals through $\tanh[3]$ will result in signal boosting, limiting, and distortion.
- Sounds such as kick drums, bass patches, and chordal pads work particularly well.
- The effect is sonically similar to compression but achieved through wave shaping as opposed to gain reduction.
- Increasing the Level will introduce soft clipping distortion/overdrive.

LIMITING (SATURATION)



Feedback Control

- $\tanh[3]$ can be inserted in a feedback path to reign in runaway feedback.
- This concept works in all feedback contexts, including delay loops, reverbs, filters, and microphones.
- In this context, it functions as a limiter on feedback amplitude.
- In this scenario, there is a much wider range at which a feedback oscillation will stabilise musically.




Manual Author: Collin Russell Manual

Design: Dominic D'Sylva

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

Documents / Resources

	<p>INSTRUO tanh 3 Waveshaper Modular [pdf] User Manual</p> <p>tanh 3 Waveshaper Modular, tanh, 3 Waveshaper Modular, Waveshaper Modular, Modular</p>
---	--