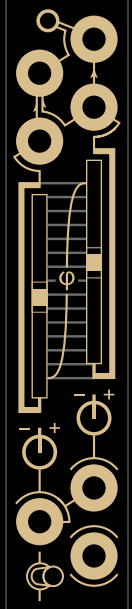
INSTRUO | SPECIALIST SYNTHESIZERS



dåpf

Dual All-Pass Filter

User Manual

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Description

Introducing dåpf, the first dedicated effects processor in the Instruō product line. The Instruō dåpf is a set of two analogue all-pass filters.

You might be asking yourself, "What is the point of a filter that passes everything?" All-pass filters don't actually attenuate frequency amplitudes directly, but rather alter the phase relationship of frequencies across the spectrum. All-pass filter stages appear in the vast majority of voltage-controlled filter topologies as well as serving as a core building block within DSP.

The normalled I/O of dåpf allows for cascaded or independent use of the two all-pass filter circuits, offering everything from classic phase-shifting to psychoacoustic stereo enhancement and synthetic Doppler effect.

Features

- Two parallel all-pass filters
- Independent attenuverters for voltage control
- 1-Pole/2-Pole configuration for channel 1
- Cascaded normalisation
- Global 1 volt per octave tracking

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 **dåpf** in your Eurorack synthesizer case.
6. Power your Eurorack synthesizer system on.

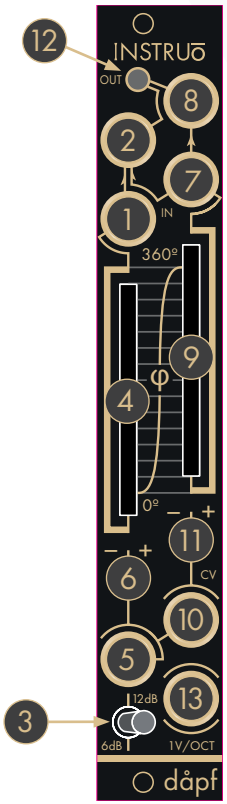
Note:

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

Specifications

- Width: 4 HP
- Depth: 30mm
- +12V: 60mA
- -12V: 60mA

dåpf | da:/f | (acronym) Dual All-pass Filter



Key

1. Channel 1 Input
2. Channel 1 Output
3. Pole Toggle
4. Channel 1 Phase Slider
5. Channel 1 Phase CV Input
6. Channel 1 Phase CV Attenuverter
7. Channel 2 Input
8. Channel 2 Output
9. Channel 2 Phase Slider
10. Channel 2 Phase CV Input
11. Channel 2 Phase CV Attenuverter
12. Output Indicator
13. 1V/Oct Input

Channel 1

Input (IN): The channel 1 **Input** (left) provides direct access to the channel 1 all-pass filter.

Output (OUT): The channel 1 **Output** (left) provides the filtered signal present at the channel 1 **Input**.

- If no cable is connected to the channel 1 **Output**, then the signal present at the channel 1 Input is processed and passed to the channel 2 **Output**. Either configuration can be used for mono-to-mono processing.

Pole Toggle: The **Pole Toggle** sets the slope of the all-pass filter.

- If the toggle is in its left position, the profile of the all-pass filter is set to -6dB/Octave (1-Pole).
- If the toggle is in its right position, the profile of the all-pass filter is set to -12dB/Octave (2-Pole).

Phase Slider: The **Phase Slider** shifts the centre frequency of the all-pass filter processing the input signal.

- If the **Slope Toggle** is set to -6dB/Octave (1-Pole), moving the **Phase Slider** from its minimum position to its maximum position results in a global phase shift of the input signal by 180°.
- If the **Slope Toggle** is set to -12dB/Octave (2-Pole), moving the **Phase Slider** from its minimum position to its maximum position results in a global phase shift of the input signal by 360°.

Phase CV Input: The **Phase CV Input** is a bipolar control voltage input for the **Phase Slider**.

- Control voltage is summed with the **Phase Slider** and scaled and/or inverted by the **Phase CV Attenuverter**.

Phase CV Attenuverter: The Phase CV Attenuverter determines the depth and polarity of external modulation applied to the phase parameter.

Channel 2

Input (IN): The channel 2 **Input** (right) provides direct access to the second all-pass filter.

- If no cable is connected to the channel 1 **Input**, the signal present at the channel 2 **Input** normals to both all-pass filter channels. In this scenario, only the corresponding phase parameter will affect the signal present at the respective channel **Output**. This can be used for mono-to-stereo processing.
- If no cable is connected to the channel 1 **Input** or channel 1 **Output**, then both channel's phase parameters will affect the signal present at the channel 2 **Input**, creating a mono sum of both **Outputs**. This can be used for mono-to-mono processing with two parallel all-pass filter stages.
- Attenuating the input signal before connecting to the channel 2 **Input** is advisable to avoid clipping.

Output (OUT): The channel 2 **Output** (right) provides the filtered signal present at the channel 2 **Input**.

Phase Slider: The Phase Slider shifts the centre frequency of the all-pass filter processing he input signal.

- Moving the **Phase Slider** from its minimum position to its maximum position results in a global phase shift of the input signal by 360°.

Phase CV Input: The **Phase CV Input** is a bipolar control voltage input for the **Phase Slider**.

- Control voltage is summed with the **Phase Slider** and scaled and/or inverted by the **Phase CV Attenuverter**.

Phase CV Attenuverter: The **Phase CV Attenuverter** determines the depth and polarity of external modulation applied to the phase parameter.

Output Indicator: The **Output Indicator** provides LED illumination of the signal amplitudes present channel 2 **Output**.

Global

1V/Oct Input: The **1V/Oct Input** is a bipolar control voltage input that is calibrated for 1 volt per octave tracking.

- Control voltage is summed with the values set by the **Phase Sliders** and **Phase CV Inputs**.

Normalling

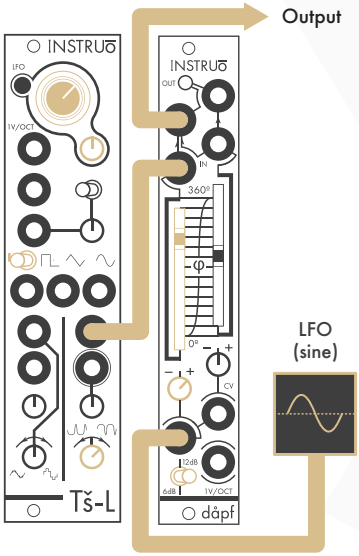
The normalling of input signals moves clockwise around the panel from the channel 2 **Input** to the channel 2 **Output**.

This normalling scheme can be used for mono-to-mono, mono-to-stereo, and stereo-to-stereo processing.

Patch Examples

Mono Phase-Shifting:

Summary: An oscillator is connected to channel 1's **Input** and monitored through channel 1's **Output**. A control voltage signal modulates the phase.



Audio Path:

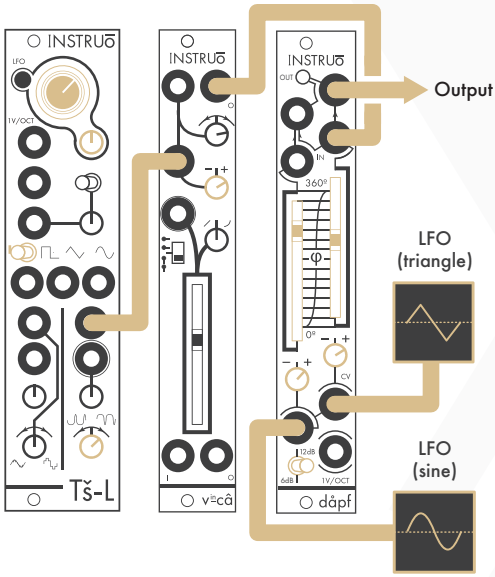
- Connect the output of a harmonically rich oscillator waveform to the channel 1 **Input**.
- Monitor from the channel 1 **Output**.
- Set the **Pole Toggle** to a desired setting.

Control Path:

- Connect a control voltage signal to the channel 1 **Phase CV Input** and set the corresponding **Phase CV Attenuverter** to a desired position. **Note:** If using bipolar control voltage signals, bias the corresponding **Phase Slider** so that negative voltage doesn't clip the **Phase CV Input**.

Serial Mono Phase-Shifting:

Summary: An oscillator is attenuated and then connected to channel 2's **Input** and monitored through channel 2's **Output**, creating a mono sum of both channels. Two different control voltage signals modulate the phase of each channel.



Audio Path:

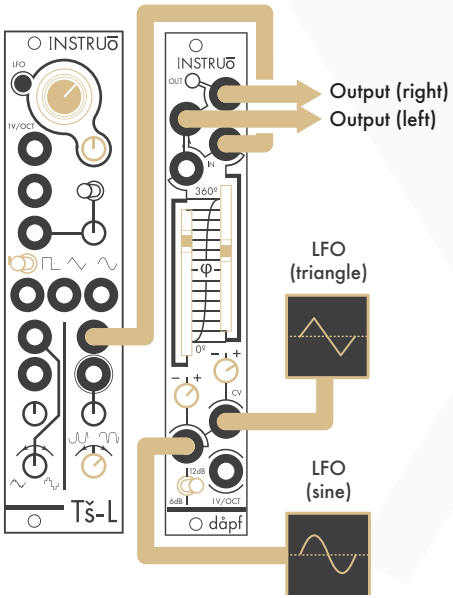
- Connect the output of a harmonically rich oscillator waveform to an attenuator to attenuate the amplitude of the waveform. Set the attenuator to a desired level.
- Connect the output of the attenuator to the channel 2 **Input**.
- Monitor from the channel 2 **Output**.
- Set the **Pole Toggle** to its right position to set a -12dB/Oct pole for channel 1.

Control Path:

- Connect two different control voltage signals to both **Phase CV Inputs** and set the corresponding **Phase CV Attenuverters** to a desired position. **Note:** If using bipolar control voltage signals, bias the corresponding **Phase Sliders** so that negative voltage doesn't clip the **Phase CV Inputs**.

Mono-to-Stereo Phase-Shifting:

Summary: An oscillator is connected to channel 2's **Input** and monitored through both **Outputs**. Two different control voltage signals modulate the phase of each channel.



Audio Path:

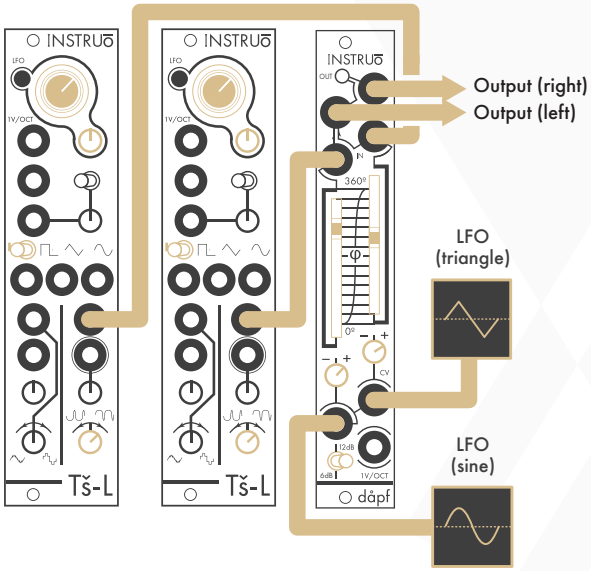
- Connect the output of a harmonically rich oscillator waveform to the channel 2 **Input**.
- Monitor from both **Outputs**.
- Both outputs will need to be externally panned hard left and hard right.
- Set the **Pole Toggle** to its right position to set a -12dB/Oct pole for channel 1.

Control Path:

- Connect two different control voltage signals to both **Phase CV Inputs** and set the corresponding **Phase CV Attenuverters** to a desired position. **Note:** If using bipolar control voltage signals, bias the corresponding **Phase Sliders** so that negative voltage doesn't clip the **Phase CV Inputs**.

Stereo Phase-Shifting:

Summary: Two oscillators are connected to both **Inputs** and monitored through both **Outputs**. Two different control voltage signals modulate the phase of each channel.



Audio Path:

- Connect the outputs of two harmonically rich oscillator waveforms to both **Inputs**.
- Monitor from both **Outputs**. **Note:** Both outputs will need to be externally panned hard left and hard right.
- Set the Pole Toggle to its right position to set a -12dB/Oct pole for channel 1.

Control Path:

- Connect two different control voltage signals to both **Phase CV Inputs** and set the corresponding **Phase CV Attenuverters** to a desired position. **Note:** If using bipolar control voltage signals, bias the corresponding **Phase Sliders** so that negative voltage doesn't clip the **Phase CV Inputs**.

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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.