



KAMIENIEC

ANALOG RESONANT PHASE ROTATOR

Model of 1977

Analog 4/6-stage phaser inspired by the 70s classics · Simultaneous four and six-stage outputs · Onboard voltage controlled wide range LFO · Additional external modulation input · Independent LFO output · Two feedback modes · Expandable by chaining additional units for multi-stage phasing



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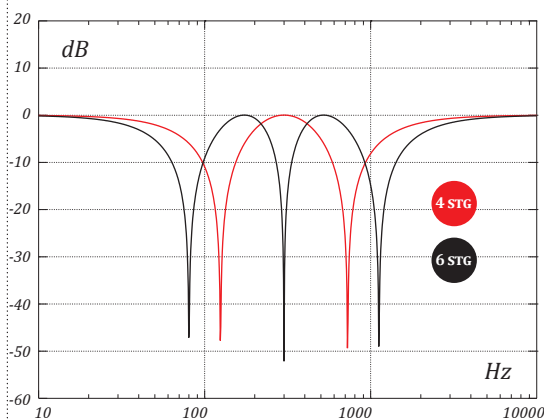
MODULE INSTALLATION

Salut! Thank you for purchasing this Xaoc Devices product. Kamieniec [*ˌkamiˈɛniɛts*] is an analog signal processing module directly inspired by a range of classic phaser effect units from 1970s that helped to define entire musical genres. Most of these classic devices contained a fairly small number of phase shifting stages, but made up for that lack with tons of character!

However, what was initially intended for guitars is not necessarily sufficient for synthesizers. Therefore, our intention is to preserve the classic sound as we transport it to a new tonal space while prioritizing flexible modular usability.

Just like many of the famous OTA-based phasers of the 1970s, Kamieniec sports four tunable stages. However, we've included two additional fixed stages so as to increase the number of notches, and ultimately offer two versions of the mixed signal (that may be used as a stereo pair) at the two outputs of the unit (fig. 1). While the general topol-

fig. 1: FREQUENCY RESPONSE OF KAMIENIEC MEASURED AT THE 4 STAGES AND 6 STAGES OUTPUTS



PHASER: THE PRINCIPLE

A typical internal structure of a phaser-type effect features a chain of stages that produce a shift in phase. Each stage comprises an all-pass filter that, by nature, does not attenuate any frequency components, but instead, shifts the phase of certain spectral components of the signal by employing a very short frequency-dependent delay.

Human ears cannot easily detect phase differences unless the phase shifted signal is mixed with the original dry signal. Since certain frequencies in the former are shifted by 180 degrees, mixing the two together results in phase cancellation creating multiple notches in the frequency response.

The number of notches is dependent on the number of stages in the chain. A feedback loop around the chain may introduce additional resonant peaks to the response. A modulation circuit (LFO) animates the frequency of the phase shift and introduces a pleasing animation of the notches.

ogy is similar to a certain very classic phaser pedal, the circuitry has been redesigned with modern components and low noise opamps to bring down the noise floor, improve the bandwidth, and offer a wider range of tuning. The feedback control can be set extremely deep, which results in a very high resonance that is capable of self-oscillation. This produces a unique sound otherwise unreachable for typical phasers, that can vary from subtle and creamy to utterly brutal and grinding.

On top of that we've included switchable feedback paths, individual stage group outputs, CV inputs, built-in LFO, and daisy chaining ability to provide a comprehensive integration with a modular synthesizer system.

INSTALLATION

The module requires 9hp worth of free space in the eurorack cabinet. The ribbon type power cable must be plugged into the bus board, paying close attention to polarity orientation. The red stripe indicates the negative 12V rail and is supposed to match the arrow head, **-12v**, or red stripe marks on both the unit and the bus board. The module itself is secured against reversed power connection, however, reversing the 16-pin header **MAY CAUSE SERIOUS DAMAGE** to other components of your system, because it will short-circuit the +12V and +5V power rails.

The module should be fastened by mounting the supplied screws before powering up. To better understand the device, we strongly advise reading through the entire manual before using the module.

MODULE OVERVIEW

MODULE CONTROLS

Looking at the front panel layout (fig.2), there is one signal **INPUT 1** and two **4/6 STAGES OUTPUTS 2**—with signal mixed after four as well as six phase shifting stages. These outputs result in a 2-notch and 3-notch frequency response, respectively, and can be used as a faux stereo pair to widen and spatially animate the signal. Of course, the outputs can also be used independently, as they each have a unique character.

The **FREQ knob 3** tunes the frequency base point for general phaser operation. Without modulation, it can serve as a manual cutoff adjustment, just like in traditional synthesizer filters. External voltage control of this tuning point is possible via the **EXT MOD input 4**. The internal LFO waveform will

be mixed with this supplied CV, unless you set the **DEPTH 5** knob to zero.

The red **RESO knob 6** controls the degree of resonance (fig. 3) by adjusting the amount of processed signal fed back into the chain of phase shifters. The module is expected to fall into self-oscillation around 3/4 of the knob's travel. This is a unique ability for a phaser, so we encourage lots of experimentation—the results can be truly inspirational.

CAUTION! THE RESONANCE MAY CAUSE A SIGNIFICANT INCREASE OF THE OUTPUT AMPLITUDE, ESPECIALLY AT EXTREME SETTINGS! For the safety of your ears (and speakers/headphones) we advise setting the **RESO knob** to zero when patching the module for the first time.

The function of the **RESONANCE MODE switch 7** is relevant to the reso knob operation. The **WASTED** and **STONED** modes select four or six phaser stages in the feedback path allowing for a variety of sound flavours. The factory default for feedback polarity is positive because it yields more radical sonic effects.

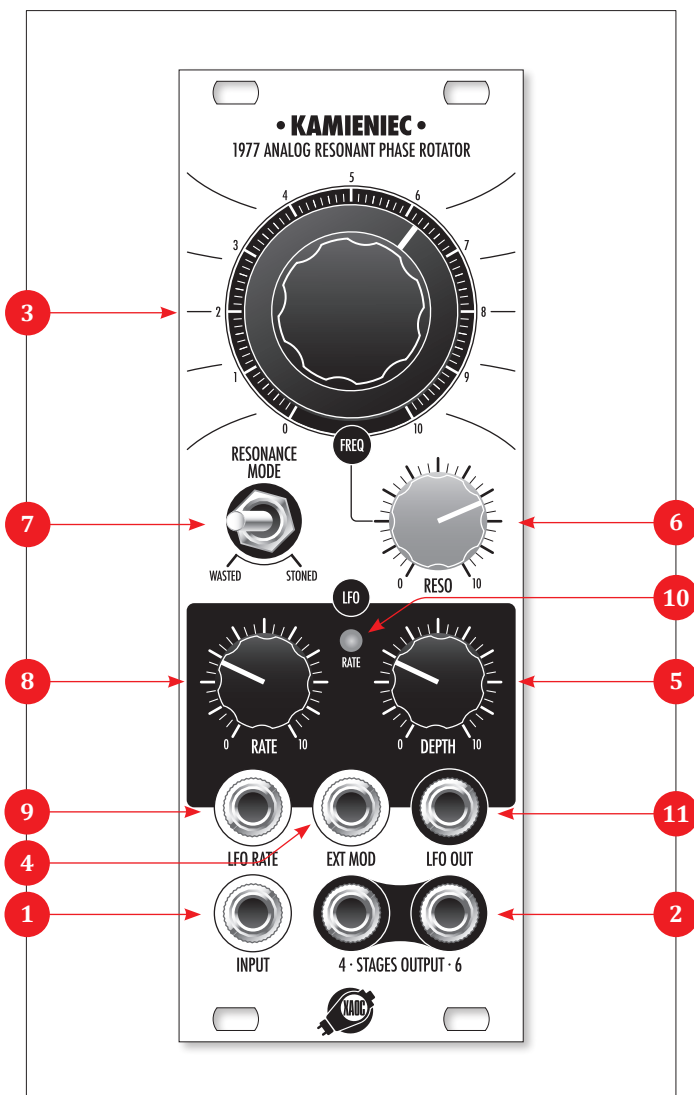
However, if you prefer a more tempered response, a jumper on the back of the module allows for negative feedback. Note that negative feedback may have no audible effect at certain combinations of output and resonance mode. Note also that removing the jumper interrupts the feedback loop thus disabling all relevant controls.

LFO SECTION

Kamieniec is equipped with an integrated voltage controlled low-frequency oscillator, serving as an onboard modulation source for the phaser. The LFO generates a triangle waveform within a wide frequency range, from one cycle per tens of seconds to audio rate (about 700Hz).

The **RATE knob 8** and the corresponding **LFO RATE voltage input 9** both control the LFO speed, indicated by the corresponding **RATE LED 10**. The **DEPTH knob 5** determines the depth of modulation by controlling the amount of LFO voltage supplied to the phaser frequency parameter in addition to the external CV. Besides sweeping the notches, the LFO can also be used independently from the module, thanks to its individual **LFO OUT** output **11**. Be aware the signal amplitude is over 8V.

fig. 2: KAMIENIEC FRONT PANEL LAYOUT AND CONTROLS



CHAINING THE MODULES

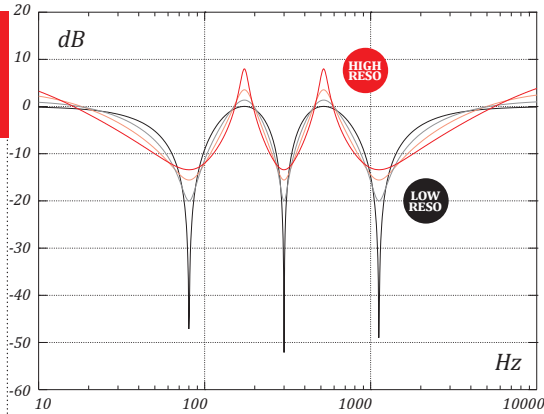


fig. 3: RESONANT RESPONSE OF KAMIENIEC WITH SWITCH SET TO STONED

CHAINING MULTIPLE UNITS

Unlike any other phaser module, multiple Kamieniec units can be chained together to achieve a more radical response with many notches. The general idea of chaining is to pass along the phase shifted signal to subsequent units before it is mixed with the original version in the last unit of the chain. This approach has a very different effect than plain cascading (connecting multiple phaser units in series), because a long chain of allpass sections yields a dense and uniform pattern of multiple notches, exactly like in a long phaser (fig. 4).

Dedicated headers on the backside of the module enable daisy chaining two or more modules using a 3-pin cable. Each preceding unit's out-header must be connected to the in-header of the next unit. This connection only aggregates the audio path, therefore to achieve the results as mentioned earlier, all units in the chain must still be tuned and voltage controlled uniformly. For example, the internal

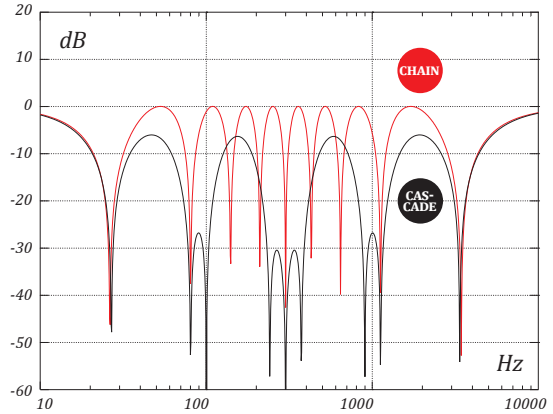


fig. 4: COMPARING THE FREQUENCY RESPONSE OF MULTIPLE PHASERS CONNECTED IN SERIES (CASCADED) VS CHAINED USING THE DEDICATED PIN HEADERS AND A RIBBON CABLE

LFO of the first unit may be patched to the ext mod inputs of subsequent units with their depth knobs turned down.

Note that chained Kamieniec modules still preserve their independent operability. For example, the outputs of preceding units offer their phasing effect with the corresponding number of notches occurring at different frequencies than the notches of the final pair of outputs. By using the outputs of two or more units in a multichannel setup, a truly immersive spatial image can be achieved. Also, patching into the input of a downstream unit overrides the processed signal passed via the backside connection allowing each unit to be used on its own.

ACCESSORY

Our Coal Mine black panels are available for all Xaoc Devices modules. Sold separately. Ask your favorite retailer. •

TECHNICAL SPECIFICATION

WIDTH	DEPTH TOTAL	CURRENT DRAW	REV. POWER PROTECT.
9hp	31mm (including cable bracket)	+40mA -40mA	protected

INPUTS		OUTPUTS	
INPUT	10Vpp, AC coupled	4 STAGES OUT	0 to 16Vpp
LFO RATE	-10V to +10V	6 STAGES OUT	0 to 16Vpp
EXT MOD	-10V to +10V	LFO OUT	10Vpp

FREQUENCY RANGE
10Hz to 30kHz

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