



Batumi

QUADRUPLE LOW
FREQUENCY OSCILLATOR
MODEL OF 1974

SALUT

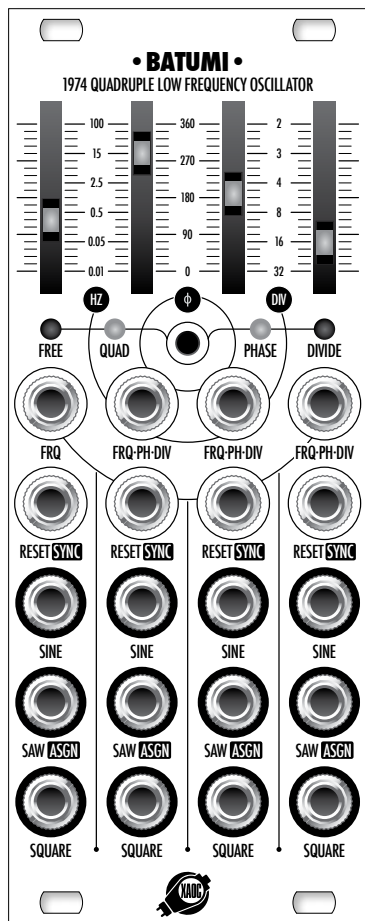
Thank you for purchasing this Xaoc Devices product. Batumi is a fully voltage controlled quadruple digital LFO module with a slew of interesting and user-customizable

features. Each oscillator can be used independently or in one of 3 synchronized modes as described in paragraphs 1 to 4. The total frequency range spans from 28 hours in voltage controlled *ДИВІДЕ* mode,

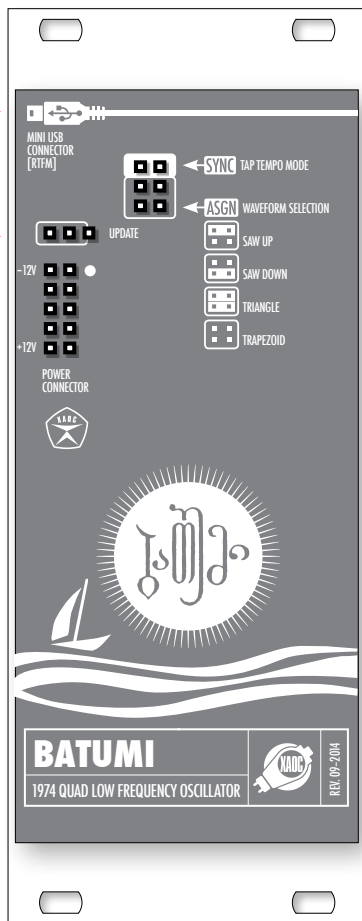
up to 500 Hz. Truly compact (only 10 hp), economically attractive yet uncompromised, Batumi is a perfect solution for portable modular setups, but can empower any system significantly.

THE MODULE EXPLAINED

PANEL CONTROLS *(see text)*



JUMPERS *(see text)*



GETTING STARTED

Ensure that you have 10 hp free space in your eurorack cabinet and turn the power off. Now, plug the provided ribbon cable into the bus board, paying close attention to its pinout and orientation. The red stripe (and a white dot) indi-

cate the negative 12 V rail, and is supposed to point the same on the busboard as well as the unit. The module has been secured against reversed power connection but it is always a good habit to pay attention to this. Now, mount the screws provided and switch your system back on.

MODULE OVERVIEW

Each LFO section is identical and consists of the same elements.

The slider potentiometer ❶ allows you to manually adjust one of the four main parameters, dependent on the global mode chosen. For the first—master LFO—it is always the

frequency rate (from 0.01 Hz to 100 Hz). In **FREE** mode, all the sliders define the frequency rate. In **QUAD** and **PHASE** mode, sliders 2–4 define the phase shift. In **DIVIDE** mode, sliders 2–4 define the multiplication of the master period.

To manually set the frequency rate more precisely, use the **ZOOM** mode, described in paragraph 6.

The **FREQ/PH/DIV** socket ② allows the corresponding slider parameter to be voltage controlled (1V/oct.). Expected voltage amplitude is 10 V and the extended frequency range 53 minutes to 500 Hz may be obtained. **SIDE NOTE:** Going above 100 Hz you can expect the waveforms to be less precise and the output amplitude lowered.

The **RESET/SYNC** socket ③ is an user-defined trigger input that can serve as either cycle reset or external tempo sync. Details to be found in paragraph 5.

The **SINE** socket ④ outputs a sine waveform (–5 to +5 V). In quad and phase modes, the sines are shifted in relation to each other.

The **SAW/ASGN** socket ⑤ outputs either a default upwards saw waveform (–5 to +5 V) or one of the user-selectable shapes, described in paragraph 7.

The **SQUARE** socket ⑥ outputs a square waveform (–5 to +5 V).

The **LFO sync mode toggle section** ⑩ allows you to set the four oscillators to run free or synced to the master, as follows:

1. FREE LFO MODE

To enter this mode, click the central button until the red, **FREE** LED lights up.

Now, any of the four LFOs works independently.

2. QUADRATURE LFO MODE

Click the central button until the yellow, **QUAD** LED lights up.

The first LFO is a master controlling the frequency for all the remaining LFOs, then each subsequent LFO generates a wave that is 90° shifted in relation to the preceding one (90°, 180°, 270°).

In this mode, sliders and control inputs for LFOs 2–4 are not active.

3. PHASE LFO MODE

Click the central button until the yellow, **PHASE** LED lights up.

Similar to quadrature mode, but allows the phase shift to be set arbitrarily.

Sliders 2–4 and **FREQ** inputs are active. **RESET/SYNC** 2–4 inputs are not active in this mode.

A TIP: In **PHASE** mode, patch one of the LFOs to control the phase shift of another. Stacking 2 or more LFOs results in very complex, interesting waveforms.

4. DIVIDE LFO MODE

Click the central button until the blue, **DIVIDE** LED lights up.

LFOs 2–4 are synced to the first (master) one and their frequency rates are subdivided. Sliders 2–4 define the multiplication ratio. Resulting cycle rates can be 2, 3, 4, 8, 16 or 32 times slower than the primary, master LFO's cycle.

RESET/SYNC 2–4 inputs are not active in this mode.

5. RESET & SYNC MODE

The **RESET/SYNC** input can serve two different purposes.

In **RESET** mode, an incoming trigger impulse resets the LFO cycle to zero state (hard sync).

In **SYNC** mode (default setting) the LFO frequency rate can be slaved to an external clock source or tapped via manual gate.

These modes are selectable by the jumper ① on the back (no jumper for **RESET**, jumper present for **SYNC**).

6. ZOOM MODE

Hold the central button for a second until the current mode LED starts to blink. Now you can adjust the frequency rates much more precisely, around the central value—as the slider travel is upscaled. Hold the button again to leave the **ZOOM** mode.

7. ASSIGNABLE WAVEFORMS

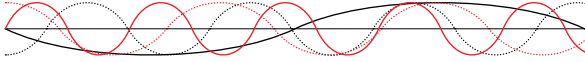
The **SAW/ASGN** output can be altered to provide other waveform types as well. In the default firmware, there are four waveform types to choose from: saw upwards, saw downwards, triangle and trapezoid. To assign the desired waveform, use the jumpers cluster ④ on the back, according to the legend printed nearby.

FIRMWARE UPDATES VIA USB

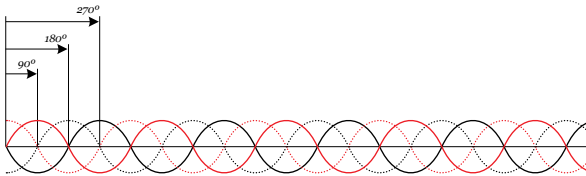
This does not end here. There are some alternate firmware revisions planned, allowing i.e. different waveforms to be assigned. The popular Mini USB standard port ⑩ allows an easy and straightforward update procedure. Detailed instructions will be bundled with the firmware package available online. **CAUTION!** Orient the **UPDATE** jumper ① in the 'on' state (jumping the left 2 pins) only while updating the firmware! Otherwise orient to the 'off' state (the right two pins).

QUADRUPLE LFO MODES

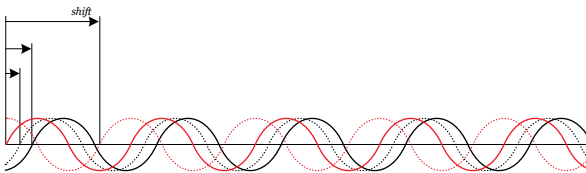
1. FREE • four free running LFOs



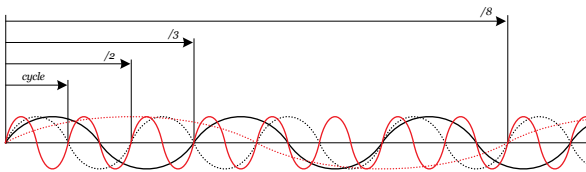
2. QUAD • fixed quadrature phase shift



3. PHASE • variable phase shift



4. DIVIDE • divisions of the main LFO frequency rate



MODULE FEATURES

- 4 voltage controlled LFOs
- free, quadrature, phase and divide modes
- assignable waveform outputs
- assignable reset/tap tempo inputs
- zoom mode for precise frequency setting
- USB connector for alternate firmware
- reversed power protection

TECHNICAL DETAILS

- eurorack synth standard compliant
- 10 hp wide
- 45 mm deep (skiff friendly)
- +12/-12V powered
- current draw: 80 mA



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ECONOMIC AID

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