BYTOM

IMPULSE INTEGRATOR

Model of 1981

OPERATOR'S MANUAL *rev. 1981/1.3*

SALUT

Thank you for purchasing this Xaoc Devices product. Bytom ['bɨtɔm] is a utility module that combines multiple gate or trigger signals. It consists of three 4-input sections whose outputs may be independent or can be combined using switches and cascaded OR logic. Bytom facilitates creating rhythms, complex modulations, and patch automation. Please note that the OR function requires non-linear processing; thus, Bytom is NOT a mixer as it does not add signals. While it can accept analog waveforms, its main purpose is to process two-state (on/off) signals, such as gates or triggers.

To better understand the device and avoid common pitfalls, we strongly advise the user to read the entire manual before using the module.

INSTALLATION

The module requires 6hp worth of free space in the Eurorack cabinet. Always turn the power off before plugging the module into the bus board using the supplied ribbon cable! The power cable must be plugged into the bus board, paying close attention to polarity orientation. The red stripe indicates the negative (–12V) rail and should match the corresponding marks on both the bus board and the unit. The module itself is secured against reversed power connection; however, reversing the 16-pin plug **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.

MODULE OVERVIEW

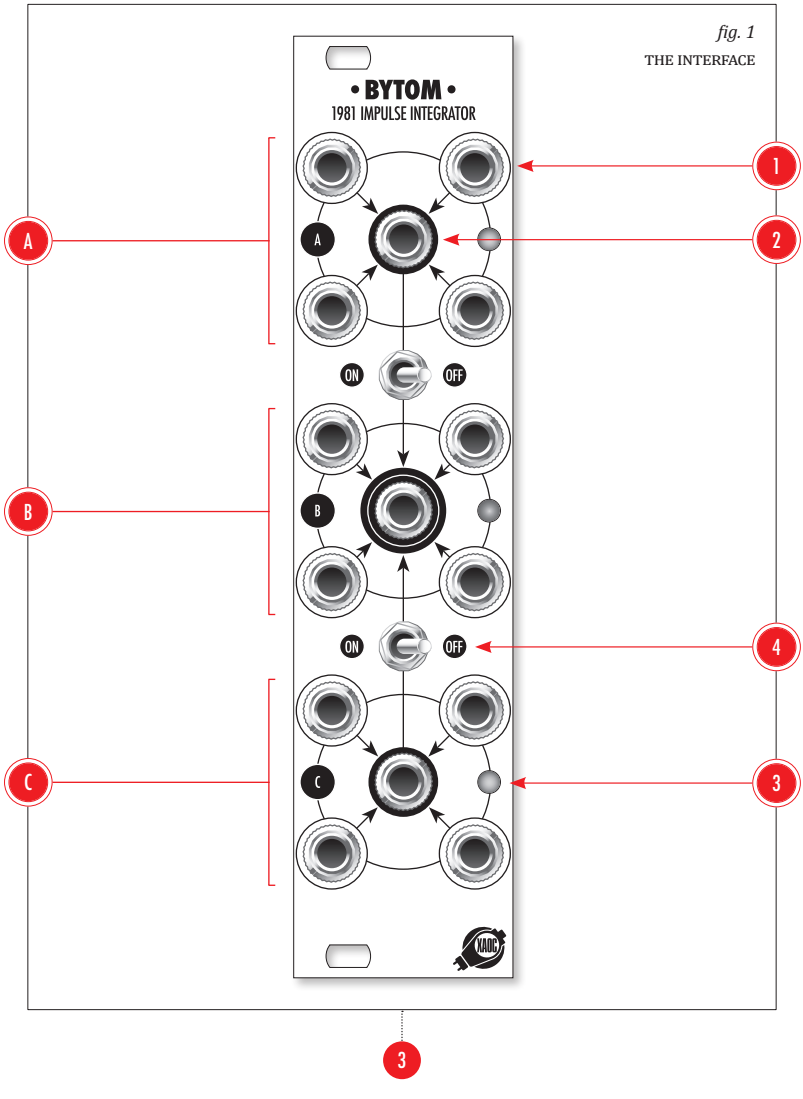
The front panel of Bytom (fig. 1) consists of three sections: **A, B,** *and* **C.** *Each can process up to four signals fed to four input sockets* ❶*. Each section features an output* ❷*, marked by a black ring around the jack. You can patch up to four separate signal sources using any combination of inputs in each section. Any unused inputs are ignored. Whenever there is an active gate in any source signal, the output becomes active, and the corresponding LED indicator* ❸ *lights up.*

The middle section can optionally combine the signals from the upper and lower sections while the corresponding switches ❹ *establish the connections according to the arrows drawn on the panel. Thus, depending on the positions of the switches, the output of the middle section is a logic OR of four inputs (section* **B** *only), logic OR of eight inputs (section* **B** *and* **A,** *or* **B** *and* **C***), or a logic OR of twelve inputs (sections* **A, B,** *and* **C***).*

NOTE: *the individual outputs of the upper and lower sections remain active even when combined with the middle section.*

fig. 1

THE INTERFACE



PRINCIPLE OF OPERATION

The logic diagram of Bytom is shown in fig. 2. Each of the three sections is a logic OR gate operating according to the truth table, fig. 3. A multi-input OR gate generates an active signal (gate ON) every time there is an active signal on ANY of its inputs.

NOTE: *negative input voltages are treated as zero or inactive. For example, patching a -8V, -3V, 0V, and 0V into the four inputs of any section results in the output value of 0V. On the other hand, patching -8V, 0V, 3V, and 5V results in 5V at the output.*

TIMING AND RACE CONDITIONS

The hardware design of Bytom ensures it can operate at extremely high frequencies (well beyond audio) with no detectable latency. Note that in certain situations, this may yield unexpected results. For example, in a modular environment, events can cascade, allowing upstream events to trigger downstream events. Such causal dependence can yield an unexpected (often unnoticeable) short gap. But you cannot beat physics; combining such non-overlapping impulses may cause discontinuity or multiple edges in Bytom's output.

The widths of these artifacts are often below 1 microsecond and, depending on their design, may or may not be registered by subsequent devices in the patch.

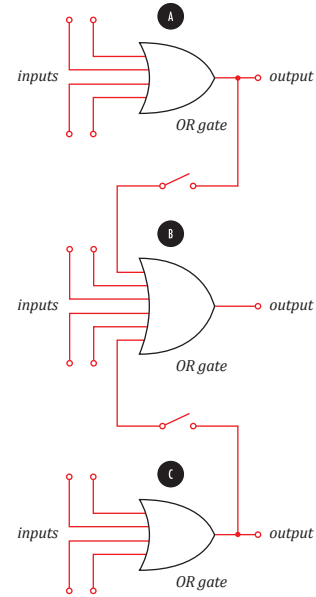


fig. 2: LOGIC DIAGRAM OF BYTOM

PATCH EXAMPLES

Some sequencers (e.g., Xaoc Devices Moskwa with Ostankino expander) offer individual step outputs that produce triggers or gates each time a particular step is reached within the sequence. Use Bytom to combine such signals into one trigger or gate signal to fire events (e.g., drum sounds) on selected steps

INPUT X_1	INPUT X_2	INPUT X_3	INPUT X_4	...	INPUT X_N	OUTPUT
0	0	0	0	...	0	0
1	—	—	—	...	—	1
—	1	—	—	...	—	1
—	—	1	—	...	—	1
—	—	—	1	...	—	1
—	—	—	—	...	1	1

fig. 3: THRUTH TABLE OF 'OR' LOGIC (MULTIPLE INPUTS). NOTE: A '—' DENOTES ANY (IRRELEVANT) VALUE

of the sequence. For example, combine gates of steps 1 and 5 of an 8-step sequence to fire a BD sound, steps 3 and 7 to fire CP or SD, and steps 2, 4, 6, and 8 for a HH.

Similarly, Bytom can combine outputs from a frequency divider/counter (like Xaoc Devices Erfurt), a multi-channel trigger sequencer, or another source of complex trigger patterns (e.g., Xaoc Devices Jena). Bytom's outputs are activated by every trigger or gate signal on any of its inputs, which creates interesting rhythms.

Within a complex patch, several independent events may occur (e.g., the EOR of an envelope, a comparator detecting some signal crossing a threshold, a Bernoulli gate output, etc.). An interesting arrangement idea is to make a step sequencer advance one step by any occurrence of these events. Bytom is handy in combining all the events into one irregular "clock" signal for the sequencer.

The switches feeding the outputs of sections **A** *and* **C** *into the middle section* **B** *are great performance tools. Suppose you have a percussion element programmed and being played by the signal from Bytom's middle output. In that case, enabling these additional connections in Bytom (***A→B, C→B***) adds hits within the rhythm, according to what is patched into the top and bottom OR gates.*

Even when you don't need the OR functions of Bytom in a particular patch, you can use its LED indicators to monitor the states of signals that may not have their own lights in other modules.

ACCESSORY

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

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FEATURES

Three independent trigger/gate 4:1 combiner sections (OR gate)

Upper and lower combiner sections can be normalled to the middle one

Basic control voltage summing

SPECIFICATION

Eurorack synthesizer format compatible

6hp wide, 31 mm deep (including the ribbon cable and bracket)

Current draw: +10mA

Reverse power protection