B KASTLE DRUM

I/O   USB POWER   OUT

DRUM MOD

BASTL

BATT | USB

B DRUM KASTLE

PITCH MOD

I/O
L   R
-        +

DECAY

DRUMS   PITCH

TRIG IN

NOISES

CLK

LFO

USB POWER   OUT
I/O

BATT

B DRUM KASTLE

DRUM MOD

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DECAY

DRUMS   PITCH

N

I/O
L   R
-        +

PITCH MOD

CLK

LFO

TRIG IN

TEMPO

CLK FEED
IN   PATTERN

TEMPO MOD

BASTL INSTRUMENTS

KASTLE DRUM

The Kastle Drum is a special edition of Bastl's classic mini modular synth focusing on algorithmic industrial glitchy drums.

How do you generate rhythm on a patchable drum machine that has neither buttons, nor a programmable sequencer? You discover it!

Drum sound synthesis with a unique dynamic acceleration charged envelope makes this rhythm box surprisingly versatile and extremely fun to play. The built-in VC clock generator with a stepped pattern sequencer can either run on its own or it can be synchronized to analog clock, while retaining the triangle LFO for parameter modulation.

The Kastle Drum is a mini modular synthesizer with a headphone output, 2 in/out ports for interfacing other gear, and it runs on just 3 AA batteries. It is ideal for beginners in modular synthesis, but it will add some quite unique functionality to any modular synthesizer system. It delivers the fun of modular synthesis at a low price and fits into your pocket so you can play it anywhere!

Kastle Drum Features
● 8 drum synthesis styles
● "noises" output for less tonal content
● DRUM selects drum sounds
● acceleration charge dynamic envelope
● decay time
● PITCH control with offset and CV input with attenuator
● voltage-controllable clock with square and triangle output
● stepped voltage generator with random, 8 step and 16 step loop mode
● 2 I/O CV ports that can be routed to any patch point
● the main output can drive headphones
● 3x AA battery operation or USB power selectable by a switch
● open source
● durable black & gold PCB enclosure

What's in the box
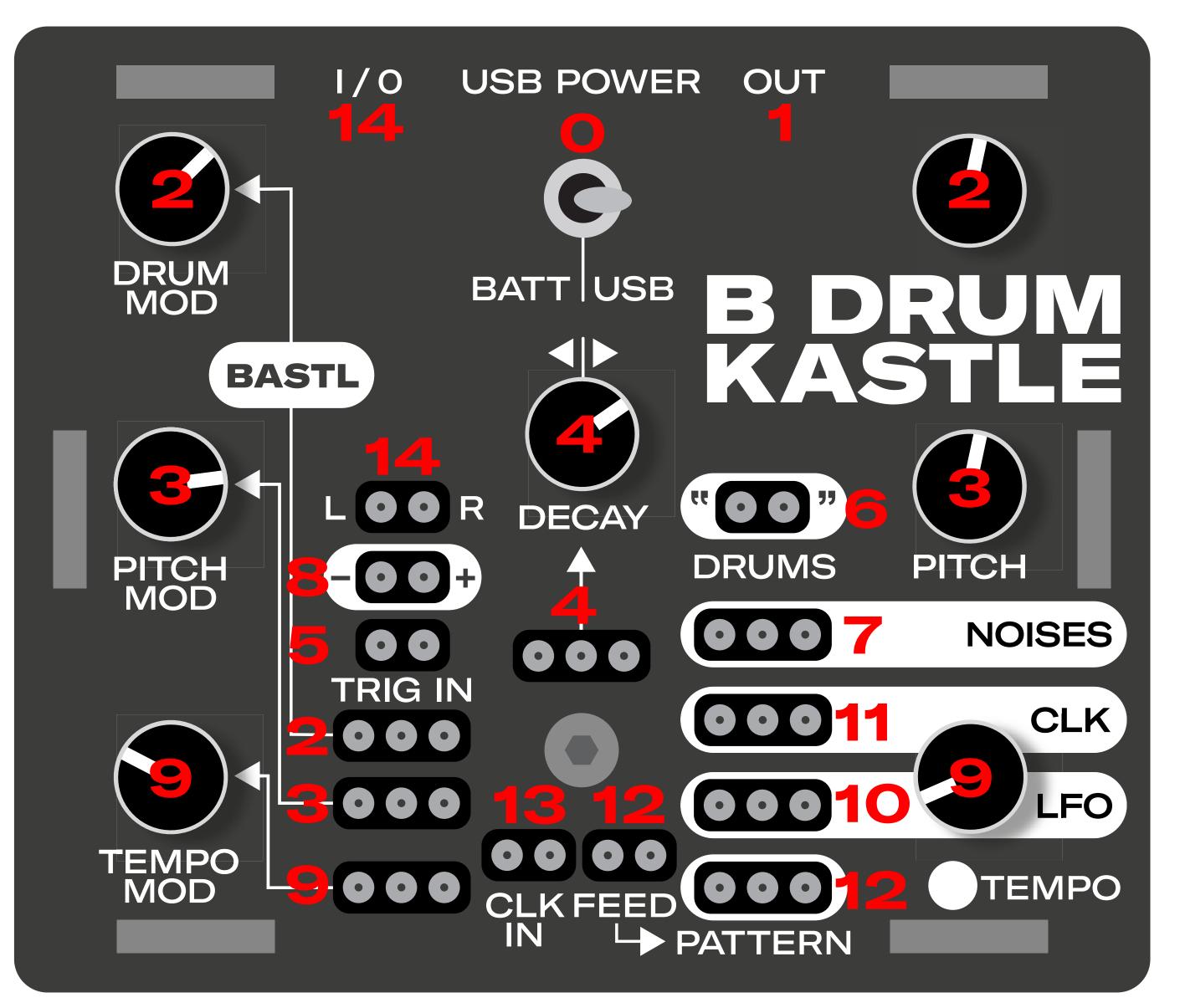● Kastle synthesizer
● 10 patch cables
● sticker
● for environmental reasons we are excluding the batteries from the package

INSTRUCTIONS

Kastle is a mini modular synth, and as in every modular synth, the sounds are programmed by connecting outputs to inputs. Outputs are labeled by a gold outline around the patch points. Inputs don't have the gold outline. Feel free to also connect inputs with inputs and outputs with outputs. There's no risk of damage, and sometimes interesting things happen with unusual connections!

I/O **14**

USB POWER **0**

OUT **1**

2 DRUM MOD

BASTL

3 PITCH MOD

14 L **R**

8 − **+**

5

TRIG IN

2

3

9 TEMPO MOD

9

0 BATT | USB

4 DECAY

4

13 **12**

CLK FEED
IN └▸ PATTERN

B DRUM KASTLE

2

6 " DRUMS "

3 PITCH

7 NOISES

11 CLK

10 LFO

9

12

● TEMPO

0 POWER UP

Find a microUSB cable or go to your nearest store and buy 3 AA batteries.

Connect the USB cable to a powered 5V USB socket or insert the batteries to the battery compartment the right way - as indicated on the battery holder.

Flip the power switch to the USB or BATT position based on which power source you are using. There is a LED close to the TEMPO knob which should light up. If it doesn't, it means the USB socket is not powered or you connected the batteries in a wrong way or they are completely depleted.

1 OUT

Use the OUT jack to connect your headphones or an audio cable from your speaker system. The main output of the drum synth engine is routed to the DRUMS jack.

2 DRUM

At the core of the main sound chip there are 8 different synthesis types falling into the categories granular noise,

fm, and experimental that are selected with the DRUM knob (top right) and modulated with the DRUM MOD socket.The DRUM MOD knob controls the amount of the modulation.

Making Drum Beat

	DRUM MOD	DRUM	DRUM MOD	DRUM	DRUM MOD	DRUM	
DRUM8							
DRUM7							
DRUM6							
DRUM5							PATTERN
DRUM4							
DRUM3							
DRUM2							
DRUM1							
DRUM BEAT	6 3 2 8 5 1 4 3		7 5 4 8 6 3 5 5		2 1 1 3 2 1 2 1		

3 PITCH

Turn the PITCH knob to adjust the PITCH of the main drum synthesis. A modulation signal can be connected to the PITCH MOD socket and the PITCH MOD knob controls the amount of the modulation.

DECAY Dynamic Envelope Charge Acceleration Yeehaw

4 DECAY

Dynamic Acceleration Charge Envelope
DECAY controls decay and pitch modulation depths with a very unique dynamic acceleration envelope.
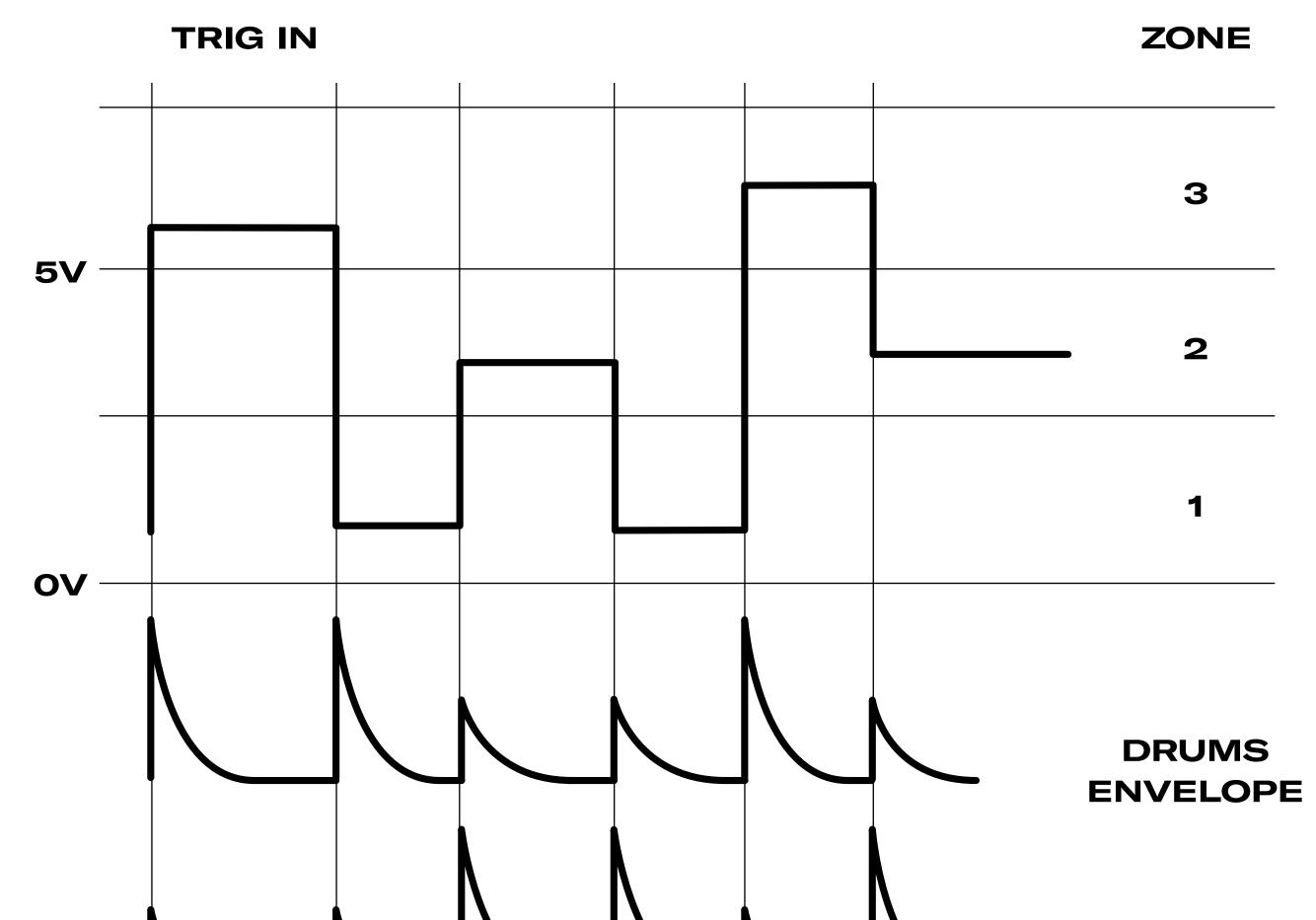
There are 2 ways to trigger or "charge" the main envelope that will produce an audible sound.

The envelope is always discharging at the rate set by the DECAY knob. The center position of the DECAY knob results in short, snappy envelopes and turning it counter-clockwise increases the depth of modulation applied to both pitch and amplitude, as well as the decay of the modulating envelope. However, turning DECAY clockwise from the center position will increase the decay time, but only resulting in amplitude modulation and no pitch modulation.
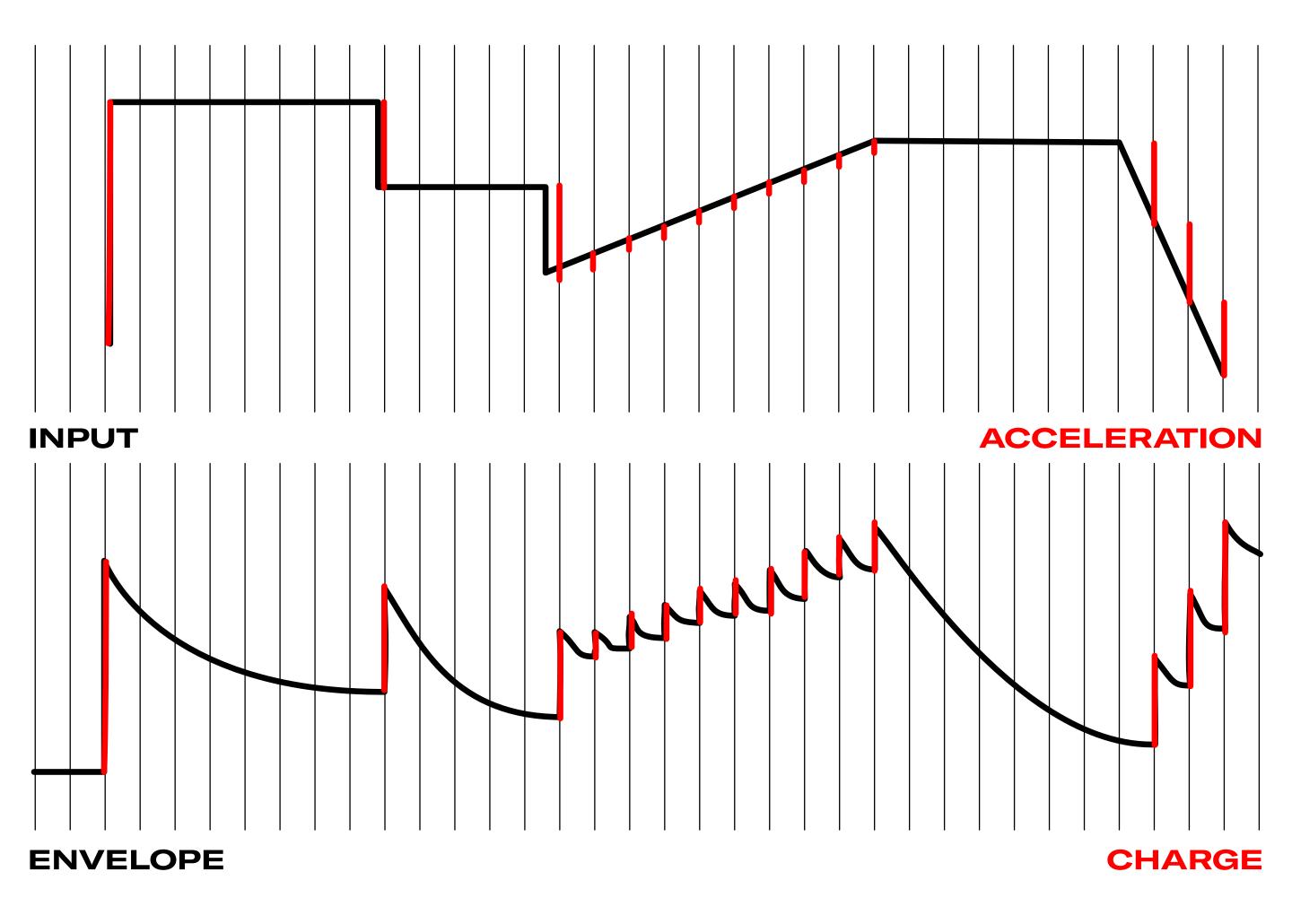
5 TRIGG IN
The TRIG IN will trigger the envelope with varying intensity based on how much change in voltage there is at the input. This will result in accented dynamic rhythms.

The TRIG IN is detecting 3 voltage zones between 0 and 5 volts. Transitioning between zone 1 and zone 3 (or back) will trigger the envelope with full intensity, however transitioning through zones 1 and 2 or 2 and 3 will result in the envelope being triggered with lower intensity and therefore also shorter decay.

Modulating the DRUM MOD input and opening the DRUM MOD potentiometer will also charge the envelope depending on the acceleration in the input voltage. If a big difference of voltage is registered in a short amount of time, the envelope will charge by a lot (stepped voltage or pulse signal) and if smoother signals are detected (triangle waveform), it will gradually charge the envelope by smaller increments, resulting in an attack envelope shape.

INPUT   ACCELERATION

ENVELOPE   CHARGE

6 "DRUMS"

This patch point can be used as another signal for your patch. When any other output is connected to this output, it will be passively mixed with the oscillator output and will go to the OUT jack. This is most useful for adding more power by connecting the NOISES output.

7 NOISES

The NOISES output is another sound output with less tonal and shorter noise-glitch bursts that could be potentially used as hi-hats.

Triggering of the NOISES output is slightly different to the "DRUM" output. On the TRIG IN, the loud envelope is produced when transitioning from zone 1 to 2 or from 2 to 3.

Quieter envelope is produced when transitioning from zone 1 to 3 or back.

Modulating the DRUM MOD socked does not trigger the NOISES output but modulating the PITCH MOD does. It means that by modulating these inputs, DRUMS and NOISES can be triggered independently.

8 MINUS AND PLUS
These patch points can be useful to set the FEED pin. "+" can be used to offset any modulation signal and "-" connects directly to ground so it can be used to connect grounds between several instruments.

9 TEMPO
Tempo sets the speed of the modulation. The modulation is displayed by an LED close to the TEMPO knob. A modulation signal can be connected to the TEMPO MOD socket and the TEMPO MOD knob sets the amount of the modulation. This is especially useful when creating more complex modulation curves.

10 LFO
The LFO socket outputs triangle waveform, but it can be altered by modulating TEMPO or triggering the CLK IN to get some complex modulation shapes.

11 CLK
The CLK output socket outputs a pulse wave in sync with the LFO triangle wave. When the LFO triangle wave is rising, the PULSE output is high and when it is falling, the output is low. This signal can be used for synchronising external equipment or modulating any of the parameters on the Kastle.

12 PATTERN
The PATTERN generator is inspired by the Rungler circuit by Rob Hordijk. It can produce 8 different voltages. It generates new voltage four times per period of the LFO. When FEED is not connected, the PATTERN output generates a 16-step pattern. When it is low (or connected to "-" patch point), it

generates an 8-step pattern. When it is high (or connected to "+" patchpoint), it keeps generating a random pattern and when it is altering, it generates a semi-random pattern. The PATTERN output is useful for modulating every single parameter of the Kastle synth or any external device with the I/O port.
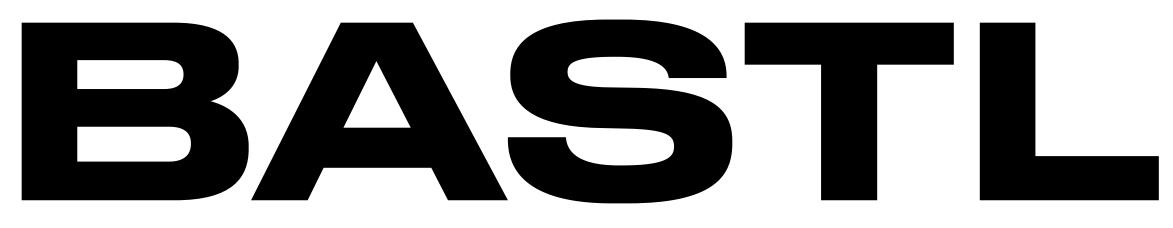
For rungler nerds only:
The PATTERN voltage is based on the current state of 3 bits of internal binary 8 bit shift register. The shift register is shifted with every new voltage generated. When this happens - based on the signal at the FEED socket - the new bit arriving to the shift register remains the same (FEED is low), is inverted (FEED is not connected) or is generated randomly (FEED is high).

13 CLK IN
The CLK IN resets the phase of the TEMPO oscillator to the highest point of the triangle and then the triangle begins to fall. This is very useful for creating complex modulation curves or for synchronising with external clock. When TEMPO is set much slower than clock at the CLK IN, the TEMPO oscillator becomes independent and the CLK IN only triggers the PATTERN generator. This way the LFO could still be used to modulate at slow rates.

14 INPUT / OUTPUT
The I/O CV port enables you to connect up to 2 modulation/audio/clock signals from Kastle to external gear, or to connect any external signal to modulate the Kastle. The signals are output with a stereo jack and the patch points L and R connect either to the left or right channel. To use both channels with a modular synth, you can use stereo to mono splitter adapter or you can just use one channel (L) with a mono cable connected to the I/O jack. When connecting external modulation to Kastle please note that the signal will be rectified and Kastle will respond to 0–5V signals only.

BASTL

more info
and video tutorials

www.bastl-instruments.com