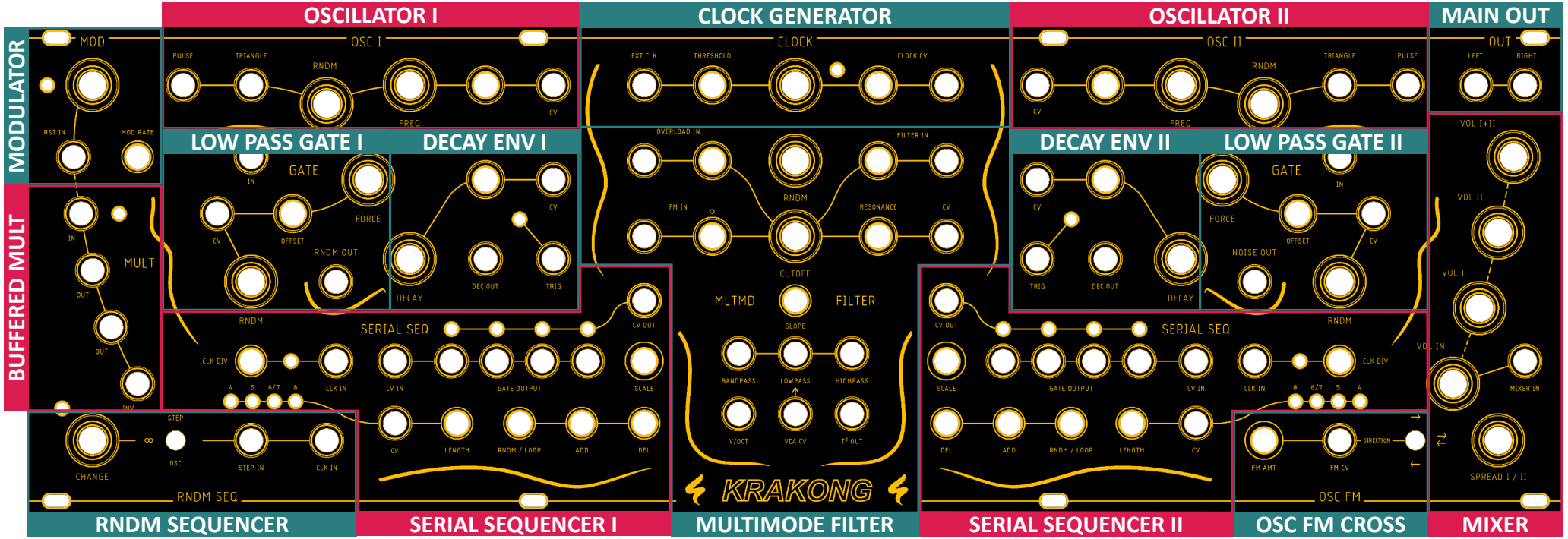
KRAKONG **QUICK START** GUIDE



KRAKONG
is a duophonic generative synthesizer, features sequencers per voice, FM crossover modulation, a random modulation sequencer, a multimode filter with VCA, a buffered multiple, and a resettable LFO. The design includes manual controls and patching connections for CV control.

Each of the two voices includes a triangle and square wave oscillator, a shift register sequencer, a decay envelope generator, and a filter-based gate. The synthesizer voices can be manually distributed in the stereo field, and a third ring-modulated output can be mixed to the main output.

The tempo of all sequencers is determined by a clock generator, controllable internally or synchronized externally to any voltage.

This instrument offers a complete structure for a wide sonic range, from rhythmic drum patterns to textured and rough synth sounds.

MODULATOR
Resettable Triangle LFO with adjustable range, normalized to the multiple input.

BUFFERED MULTIPLE
1-to-3 buffered multiple with one inverted CV output.

RNDM SEQUENCER
Randomised CV sequencer with loop functionality applied via the RNDM controls.

OSCILLATOR I + II
Analog oscillators with triangle and pulse wave outputs. These oscillators do not track 1V/octave.

LOW PASS GATE I + II
Filter-based low pass gates with external input, cutoff offset und CV input.

DECAY ENV I + II
CV decay envelope for controlling the LPG. The envelope is triggered by the serial sequencers, but also allows external trigger signals.

SERIAL SEQUENCER I + II
Random CV sequencer for seamless looping with a specified step length. CV control for length adjustment and external CV influence on stored voltages per clock and step. Change voltages and gates using the RNDM/LOOP button or individually per step with ADD and DEL buttons.

CLOCK GENERATOR
CV clock generator that also accepts external audio for synchronization. The generator clocks the three sequencers.

MULTIMODE FILTER
CV filter featuring lowpass, highpass, and bandpass outputs, a built-in VCA, and two external inputs, one with diode clipping. The ring-modulated output of both oscillator triangle waves is internally normalized to the filter.

OSC FM CROSS-MODULATOR
CV cross-modulation for the oscillator FM inputs with the opposite oscillator's triangle wave or both simultaneously.

OUTPUT
Stereo output at modular levels.

MIXER
4-channel mixer for mixing the oscillator outputs and external signals. It also offers the option of distributing OSC I and II in the stereo field (L + R OUT).

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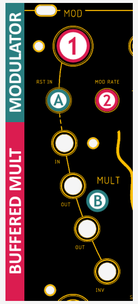
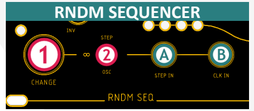
MODULATOR / BUFFERED MULT



This modulator is a **low frequency oscillator** that produces a triangle wave normalized to the multiple input, the OSC II CV and filter FM input. You can change its rate **(1)** and rate range **(2)** and also reset it with a trigger **(A)**. Below is a **1 to 3 buffered multiple** with an inverted output.

RNDM SEQUENCER

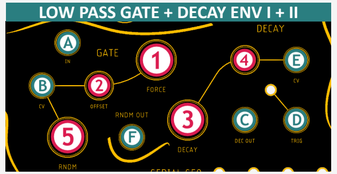


The **random CV generator** produces random voltages **that can be changed and looped** using the CHANGE potentiometer **(1)**. The sequencer can be **clocked internally** by a CLOCK generator **or externally** via the CLK IN socket. Influence the generated CV with external voltage **(A)**. The STEP/∞/OSC SWITCH switch **(2)** controls whether the CHANGE button is influenced via the STEP IN input or the OSC I PULSE waveform. In centre position, no additional changes are made to the CHANGE button. The output of this sequencer is routed via the **RNDM potentiometers** to the oscillators, low-pass gates, decay envelopes and the multimode filter as well as to the CLOCK CV input.

OSCILLATOR I + II

Both sound generators, OSC I and OSC II, feature identical **analog oscillators** providing both **PULSE (A)** and **TRIANGLE (B)** outputs. The latter is internally connected to the low pass gate. The oscillators' frequency can be adjusted using the FREQ potentiometer **(1)** or via CV input **(C)** with an attenuator **(2)**. When the CV input is unpatched, a square wave from the MODULATOR is normalized to the OSC I CV input, and a triangle wave is normalized to the OSC II CV input. The RNDM knob **(3)** introduces the RNDM SEQ output to modulate the pitch of the oscillator.

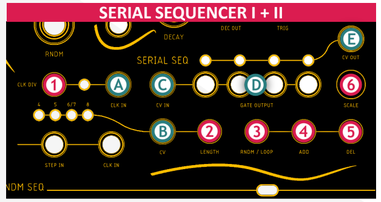
LOW PASS GATE + DECAY ENV I + II



KRAKONG incorporates a filter-based **low pass gate (LPG)** and **decay envelope** for each oscillator. The triangle output is automatically connected to the LPG input IN **(A)**, which can also accommodate external signals. The **FORCE control (1) determines the level of DECAY CV applied** to the LPG, while the OFFSET control **(2)** sets the cutoff offset. You can control this offset with voltage via the CV input **(B)** or apply CV from the RNDM SEQ with the help of the RNDM knob **(5)**. The **LPG is under direct influence of the decay envelope**, **triggered internally by each SERIAL SEQUENCER** or externally via the TRIG input **(D)**. The decay output is accessible through the DEC OUT socket **(C)**. Manage the **decay length using the DECAY potentiometer (3)** or introduce CV control through the CV input **(E)** and its associated attenuator **(4)**. If left unpatched, the CV input is normalized to the RNDM SEQUENCER output. A jumper on the PCB allows you to select whether the first decay output is inverted to negative voltages.

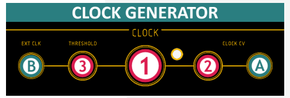
There is also a **RNDM OUT (F) socket**, which provides access to the output of the RNDM SEQUENCER and a **NOISE OUTPUT** in the second DECAY section (not shown above).

SERIAL SEQUENCER I + II



The **two serial sequence**r generate **random gates and voltages for seamless looping with a specified step length**. It's clocked by the internal generator but can process external clock signals **(A)**. Use the CLK DIV button **(1)** to **divide the clock signal** by 2 or 8 (selectable via PCB jumper). Choose sequence length via CV **(B)** or manually with the LENGTH knob **(2)**, selecting 4, 5, 6/7 (selectable via PCB jumper) or 8 steps. Use the RNDM/LOOP rotary knob to **switch a loop of the voltage sequence on or off (3)**. **Add or delete voltages to a step** with ADD **(4)** and DEL **(5)** when pressed simultaneously with a CLOCK signal. **Influence sequence voltage** by patching CV to to CV IN **(C)**. Access individual gates from GATE OUTPUTS **(D)** and active step CV from CV OUT **(E)**. Set the **maximum voltage** with the SCALE potentiometer. **(6)**. The last step of a sequence triggers the corresponding decay envelope.

CLOCK GENERATOR



The internal clock generator drives the random sequencer and two serial sequencers. Adjust the **clock rate** manually using the CLOCK knob **(1)** or via CV with the CLOCK CV input **(A)** and its attenuator **(2)**. The clock spans from one every 10 seconds to audio rates. It is possible to override the internal clock with an **external clock** signal via the EXT CLK input **(B)**. This input accepts any voltage (not just clock, trigger or pulse signals) and **generates a clock signal from a certain threshold value**, which you can determine using the THRESHOLD potentiometer **(3)**. This means you can also **use audio signals to clock KRAKONG**.

QUESTIONS?

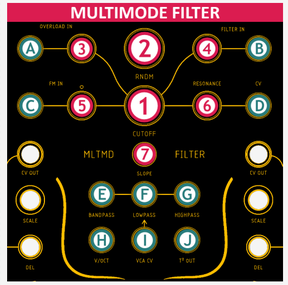
Feel free to post your question in a new thread on the **ST Modular Forum** at:

→ **www.st-modular.de/forum**

PATCH IDEAS

→ Utilize the **multimode filter in self-oscillation as a third oscillator** by lowering the I+II volume, patching a sequence into the v/oct input and CV to the VCA. → **Add some noise** to the mix by patching the noise output into the filter overload input. → Turn the gate offsets up to unleash **Krakong´s full droning capabilities** → **CV modulate the OSC FM amount**! → **Use external audio to clock Krakong**. Play with the threshold to get different results! → Patch the **CV output of the serial sequencers to the FREQ input** of the oscillators to get its full effect! → Why not patching the **pulse output into the gate** input? Or one of the many **sequencer gate outputs into the decay trigger** input?

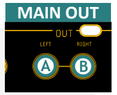
MULTIMODE FILTER



The **multimode filter** receives a **ring-modulated output** signal from the two oscillators and provides three different filtered outputs: **BANDPASS (E), LOWPASS (F) and HIGHPASS (G)**. The cutoff frequency can be set manually with the **CUTOFF knob (1)** or via CV from the **FM IN input (C)** and its corresponding bipolar (+/-) attenuator **(5)**. When left unpatched, the modulator's triangle wave is automatically normalized to this input. You can also apply CV from the RNDM output to the filter cutoff using the RNDM control **(2)**. Blend **two external signals** into the ring-modulated signal by using the OVERLOAD IN input **(A)** and the FILTER IN input **(B)**, adjusting their intensity with the respective attenuators **(3 + 4)**. An **extra diode clipping circuit saturates the overload input**. The resonance can be adjusted with the RESONANCE control **(6)** and its CV input **(D)**. **The resonance goes up to self-oscillation** and can be used to play the filter as a **third oscillator with 1V per octave tracking** via the V/OCT input **(H)**.

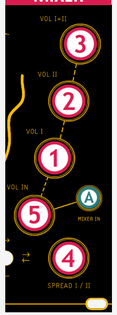
Change the **slope of the filter** from 2-pole (12db) to 4-pole (24db) with the SLOPE button **(7)**. Utilize the internal **VCA connected to the LOWPASS** output **(F)** by patching any CV into the VCA CV input **(I)**. Achieve precise control over signal amplification for the LOWPASS output, facilitating the use of the multimode filter as a third oscillator when resonance is increased to self-oscillation. As an added benefit, **access the ring-modulated output** signal from the two oscillators via the T² OUT socket **(J)** for external routing.

MAIN OUT



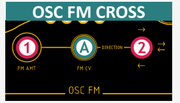
Main stereo output for the LEFT **(A)** and RIGHT **(B)** channels. This output provides **modular levels** and can be adjusted via the parameters in the mixer section.

MIXER



KRAKONG features a built-in **4-channel mixer** for **blending oscillator outputs**. **VOL I (1)** carries the first LPG output (OSC I triangle wave by default), **VOL II (2)** is fed from the second LPG (OSC II triangle wave by default), and **VOL I+II (3)** adjusts the multimode filter lowpass/VCA output. Without further patching this channel carries the ring-modulated triangle waveform of both oscillators processed by the multimode filter. Use VOL IN **(5)** and MIXER IN (A) to **mix in an external signal**. Furthermore **SPREAD I / II (4) extends the panning for OSC I and OSC II** in opposite directions and thus distributes the two outputs in the stereo field. The ring-modulated output of OSC I and OSC II remains in the centre position. This way you can also use the stereo outputs as **individual OSC outputs**.

OSC FM CROSS



Oscillator FM Cross-Modulation enables control over the **frequency modulation applied to the oscillator FM inputs**. It utilizes the triangle waveform of both oscillators, routing it either to the other oscillator **(OSC I controlling OSC II or OSC II modulating OSC I) or both** modulating each other. The DIRECTION switch **(2)** allows you to **select the direction**. Adjust the amount manually with the FM AMT knob **(1)** or via CV using the FM CV input **(A)**, with the CV turning the FM AMT control into an attenuator. This feature significantly enhances the sonic potential of the oscillators, and it's advisable to **utilize one of KRAKONG's numerous CV outputs to control it**.

CALIBRATION of jumpers and trimmers on the back of the PCB

Jumpers

DEC1_NORM_INV → Set Decay I output to normal or inverted; **SEQ1_DIV2/8** → Set clock division for Serial Seq I to either /2 or /8 when the corresponding button CLK DIV is pressed; **SEQ2_DIV4/16** → Set clock division for Serial Seq II to either /4 or /16 when the corresponding button CLK DIV is pressed; **SER1_6_OR_7** → Set the third step length of Serial Seq I to either 6 or 7 steps; **SER2_6_OR_7** → Set the third step length of Serial Seq II to either 6 or 7 steps.

Trimmers

GATE1_FDBK/GATE2_FDBK → Adjusts the amount of feedback for LPG 1+2, similar to resonance. Set to taste!
DEC1_RESP/DEC2_RESP → Fine tune of the decay length (snappy to long). Adjust to taste!
GAIN_I, GAIN_II, GAINI_II → Adjusts the gain of OSC 1 , 2 and 1+2 (RingMod) in the mixer stage.
1V/OCT (MLTMD Filter) → Disconnect any input signal or FM modulation CV, set the FREQ control to about 10 to 11 o'clock, set the RES knob to its maximum position, listen to the lowpass output and adjust the trimmer until the octaves played on a CV keyboard are correctly reproduced.
JITTER_CAL (for both SERIAL SEQUENCERS) → Turn the SCALE controls fully to the right and lengths to either 8 steps, connect a pulse VCO to the serial sequencer´s clock input - the pitch of the VCO should be in the middle range, listen to the CV output of the same serial sequencer, push the RNDM/LOOP button of the sequencers and turn the JITTER_CAL trimmer until no glitch is heard for at least 10 seconds. The calibration of the two serial sequencers is completed.

KRAKONG

SIMPLIFIED BLOCK DIAGRAM