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BASTL

INSTRUMENTS

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KASTLE ARP

Kastle ARP is a unique modular melody generator based on a quantized sine wave oscillator with a digital waveshaper. The pitch selection employs straightforward concepts to unleash surprising intricacy. The quantized oscillator ensures it is always in tune, and its pitch can be selected using the NOTE and CHORD inputs. The decay envelope adds variation by occasionally skipping pitches before retriggering. The timbre control allows you to blend between noble sine waves and 8-bit chip-tunes.

Kastle ARP features a versatile LFO section, inherited from the original Kastle Drum, that combines simplicity with complexity. In boot-mode, you can easily access the root note and fine pitch tuning. Additionally, the bass output plays the root pitch of the current chord, enhancing the overall sound.

For maximum joy, try running your Kastle ARP through delay and reverb effects. By combining it with other Kastle synths, you can achieve unparalleled patch flexibility.

Features

- quantized-pitch sine wave oscillator
- NOTE knob to browse thru 8 octaves
- timbre xor waveshaper
- CHORD CV input switches between 3 chords

- CV controllable decay envelope generator
- triggered pitch with "negative" decay to achieve melodic variation
- BASS output with the root of the chord
- boot mode to set a root note and fine-tune
- voltage-controllable clock with square and triangle output
- stepped voltage generator with random, 8-step, and 16-step loop modes
- two I/O CV ports routable to any patch point
- the main OUT capable of driving headphones
- 3x AA battery operation or USB power, selectable by a switch
- open source
- durable black & silver 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 ARP is a mini modular synth, and like every modular synth, the sounds are programmed by connecting outputs to inputs. Outputs are labeled with a silver outline around the patch points, while inputs do not have the silver outline. But feel free to patch inputs to inputs and outputs to outputs on the Kastle synths; it´s without any risk of damage. In fact, sometimes interesting things can happen with unusual connections!
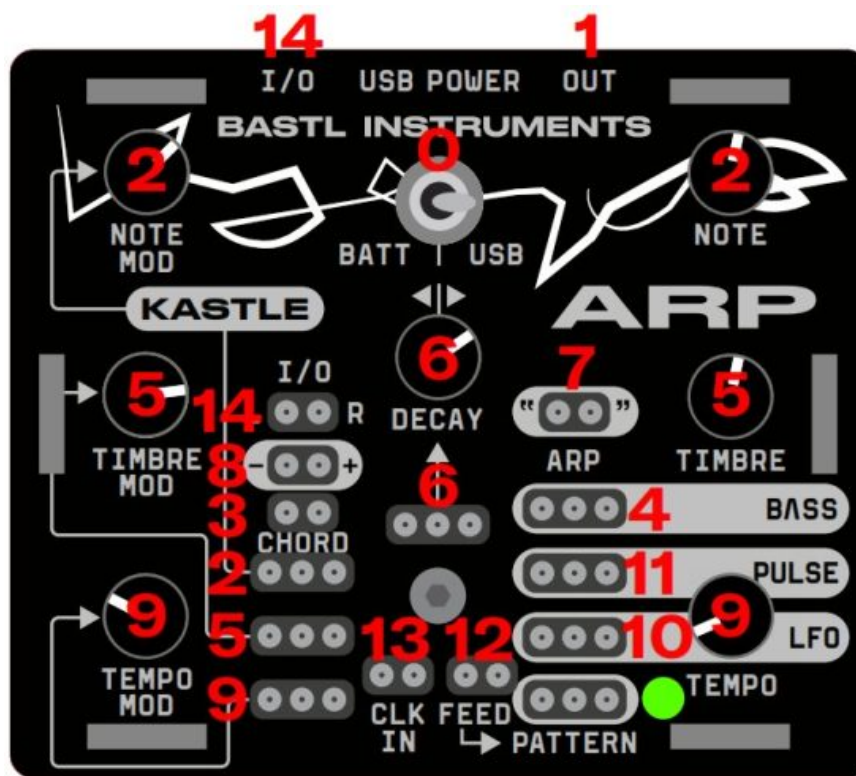
0 POWER UP

To start using the Kastle ARP, you will need either a micro USB cable or 3 AA batteries. If you have a cable, connect it to a powered 5V USB socket. If you're using batteries, make sure to insert them into the battery compartment correctly, following the instructions on the battery holder. Next, flip the power switch to either the USB or BATT position, depending on your power source. Look for the LED near the TEMPO knob – it should light up. If it doesn't, it means the USB socket is not powered, the batteries are incorrectly inserted, or they may need to be replaced.

Note: Kastle ARP may sound different when powered by AA batteries than when powered via USB due to the difference in voltages (5V on USB vs. 4.5V via AA batteries).

1 OUT

Use the OUT jack to connect your headphones or speaker system. The main output of the arp synth engine is routed to the ARP patch point.

2 NOTE

The NOTE knob (located at the top right) selects the note to be played. By turning the knob, you can hear different notes. You can modulate the NOTE MOD input with an LFO, allowing the Kastle ARP to create melodies on its own. The NOTE MOD knob controls the amount of the modulation. Every time a note is changed, the envelope will

be triggered. For more information about the envelope, please refer to the DECAY section.

3 CHORD

The selection of notes played by the NOTE knob is influenced by the setting of the CHORD input. When the CHORD input is unplugged, it plays a major triad in C major. When connected to the "+" patch point, it plays a G major triad, and when connected to the "-" patch point, it plays an F major triad.

CHORD INPUT:

	DEGREE	CHORD	NOTES
+ 5V	V.	G	GBD
unconnected	I.	C	CEG
- 0V	IV.	F	FAC
			(ROOT C)

TO CHANGE THE ROOT NOTE TO A DIFFERENT KEY, PLEASE REFER TO THE BOOT MODE SECTION.

4 BASS

The BASS output produces the sine wave bass root note of the chord selected by the CHORD input. Patch BASS to ARP to mix the two signals and listen to both through the main output.

5 TIMBRE

The TIMBRE knob controls the wave shaping of the main output. When turned fully to the left, it produces a smooth and pure sine wave. As you rotate it towards the right, it applies digital wave folding using an XOR function, which adds complexity and harmonics to the sound.
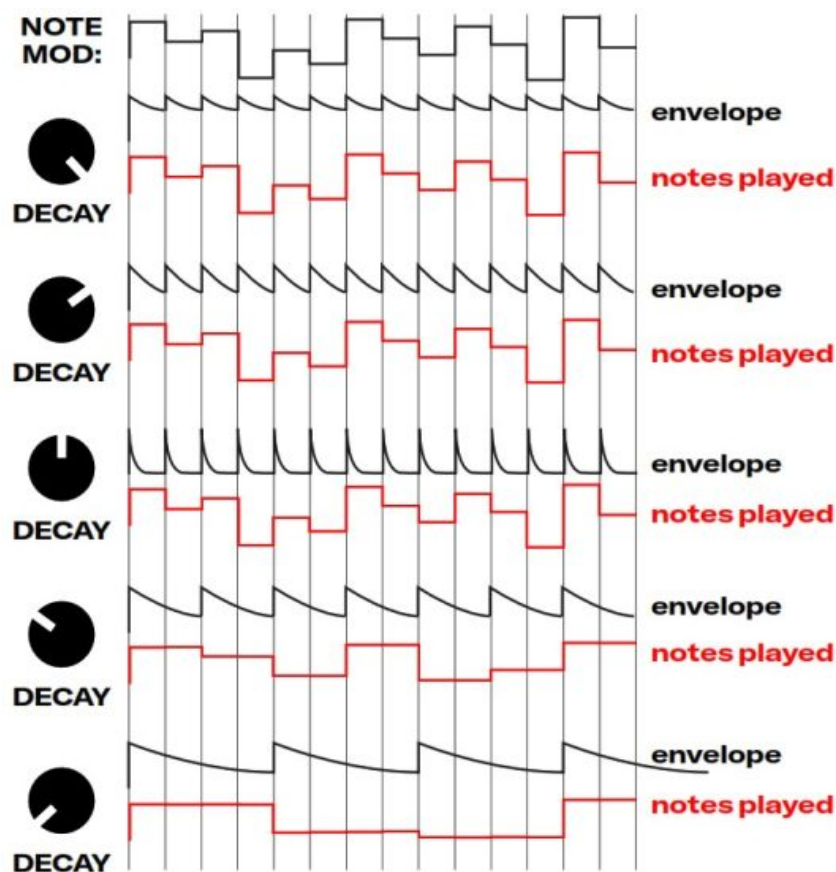
6 DECAY

The DECAY envelope controls the loudness of the main oscillator in a decaying curve. The speed of the decay is the shortest when the DECAY knob is in the middle and gets longer when you turn it left or right.

envelope

does not retrigger ←—+—→ **retriggers**

DECAY DECAY DECAY DECAY DECAY
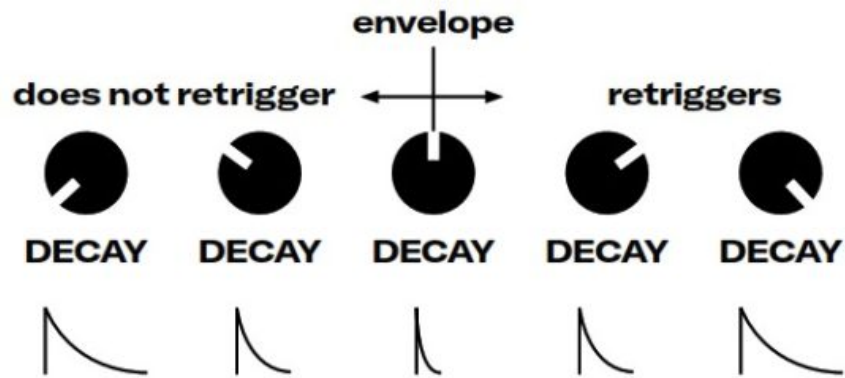
However, the DECAY envelope is also a key factor in playing melodies on the Kastle ARP. Each time a note changes (either via NOTE or CHORD), the envelope is triggered. When the decay knob is turned to the left (CCW) of the 12 o'clock position, the envelope will only re-trigger once it falls below a certain threshold.

Additionally, the note only changes when the envelope is triggered. Therefore, by lengthening the envelope to the left, certain notes will be skipped. The resulting melody will be created by the interference pattern of the LFO speed and the DECAY time of the envelope. This allows you to bring a lot more complexity and depth to your melodies.

NOTE MOD:

DECAY — envelope / notes played

DECAY — envelope / notes played

DECAY — envelope / notes played

DECAY — envelope / notes played

DECAY — envelope / notes played

7 ARP

This is the primary output from the oscillator that is audible at the OUT jack.

This patch point can be utilized as an additional output for your patch, but it is particularly convenient for passively mixing the BASS output with the main oscillator.

With the BASS output patched to ARP, you will be able to hear both at the OUT jack.

8 MINUS & PLUS

These patch points can be used for setting the FEED or CHORD pin. The "+" patch point can be utilized to offset any modulation signal, while the "-" patch point connects directly to ground, which is useful for establishing a common ground between multiple instruments.

BOOT MODE

The boot mode allows you to modify the root key and fine-tune the Kastle ARP. To access the boot mode, follow these steps:

1. Switch off the Kastle ARP.
2. Disconnect all patch cables.
3. Connect CHORD to the "+" patch point.
4. Turn the NOTE, TIMBRE, and DECAY knobs completely to the right (CW).
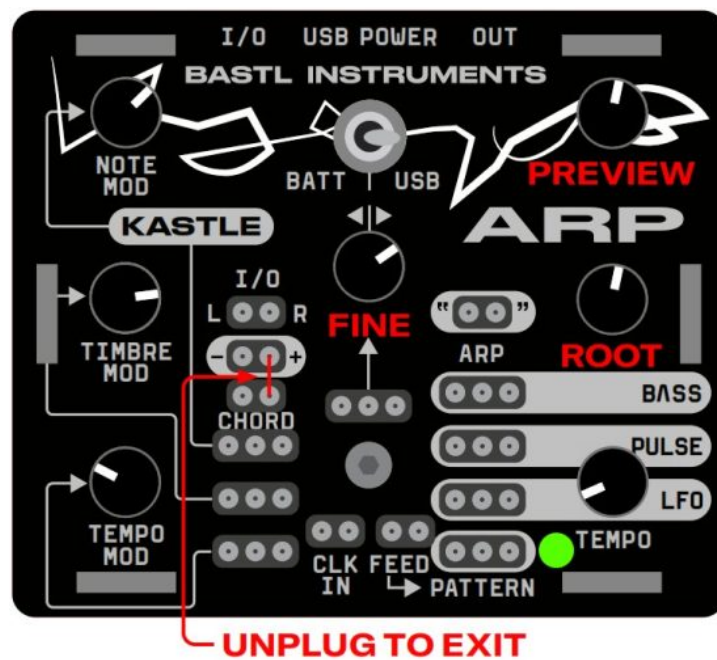5. Power on the Kastle ARP.
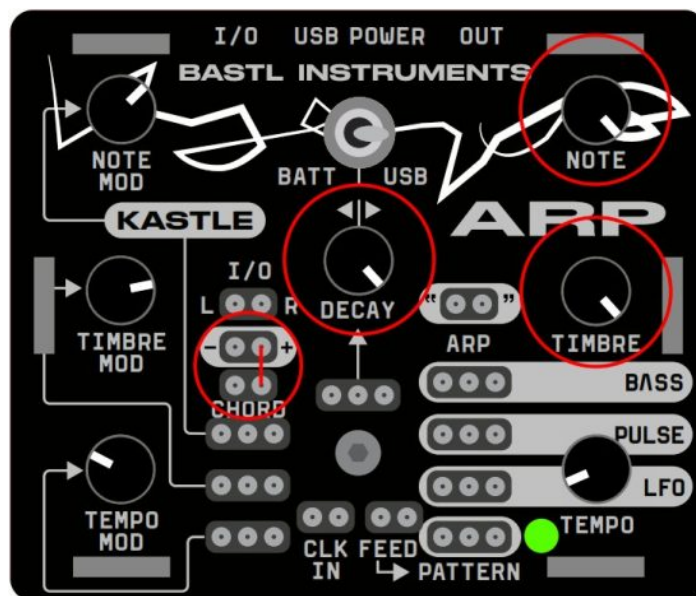
While in boot mode:

The NOTE knob provides a preview of the root triad chord corresponding to the selected root key.

The TIMBRE knob determines the root key (C is fully turned counterclockwise).

The DECAY knob serves as FINE-TUNE (A=440Hz can be found around the center position).

It is advisable to have your tuner active during the boot mode to assist you in making accurate adjustments.
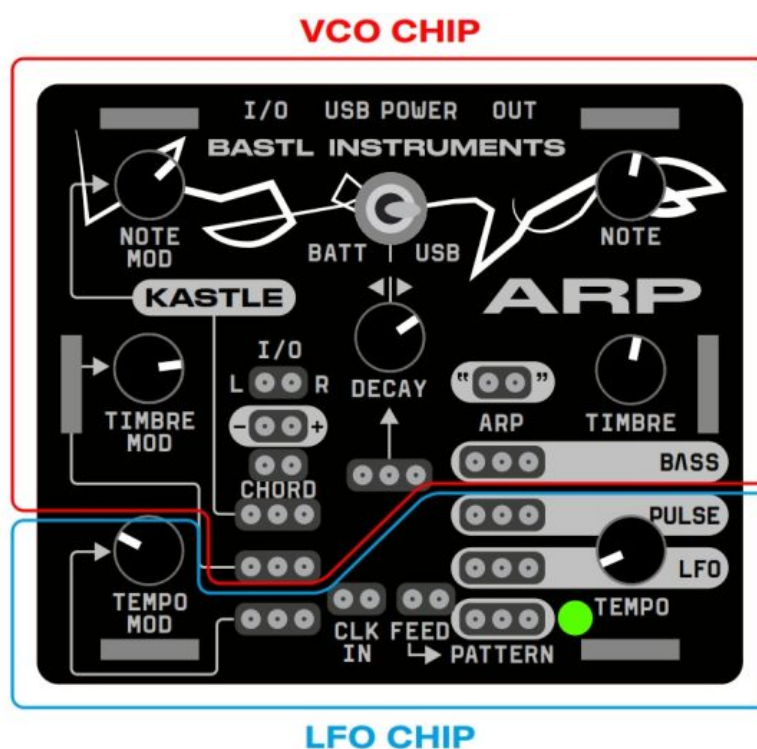

To exit the boot mode, disconnect the patch cable from the CHORD input.

The ROOT and FINE-TUNE settings will be saved in the memory and loaded when the Kastle ARP is turned on again.

THE LFO SECTION

The Kastle synth features 2 ATtiny chips – each programmed independently.

The LFO section remains unchanged from the Kastle Drum LFO.

9 TEMPO

The TEMPO knob sets the speed of the modulation and affects all the LFO outputs (PATTERN, LFO, and PULSE). The LFO modulation is displayed by an LED close to the TEMPO knob. A modulation signal can be connected to the TEMPO MOD socket, while 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 a triangle waveform, but it can be altered by modulating TEMPO or triggering the CLK IN to get some complex modulation shapes.

11 PULSE

The PULSE output emits a pulse wave that is synchronized with the LFO triangle wave and has a frequency that is twice as high. This signal can be utilized to synchronize external equipment or modulate any of the Kastle parameters.

12 PATTERN

The PATTERN generator is inspired by the Rungler circuit by Rob Hordijk.

It can produce 8 different voltages. It generates a new voltage four times within each cycle of the triangle LFO.

When FEED is not connected, the PATTERN output generates a 16-step pattern. When FEED is set to low voltage close to 0 Volts (i.e. connected to the "-" patch point), PATTERN generates an 8-step pattern. When it is set to high voltage close to 5 Volts (i.e. connected to the "+" patch point), PATTERN continuously generates a random pattern, and when FEED is modulated by a varying analog voltage signal, PATTERN generates a semi-random pattern. The PATTERN output is great for modulating every single one of the Kastle parameters or any external device through the I/O port.

For rungler nerds only:

The PATTERN voltage is determined by the present state of 3 bits within the internal binary 8-bit shift register. Each time a new voltage is about to be generated, the shift register is updated and the 3 bits are combined to generate this new voltage at the PATTERN output. When this happens, the new bit arriving at the shift register either remains the same (when FEED is LOW), is inverted (when FEED is not connected) or is generated randomly (when FEED is HIGH).

13 CLK IN

The CLK IN resets the phase of the TEMPO oscillator to the lowest point of the triangle, and then the triangle begins to rise. Additionally, it forces the PATTERN generator to advance to the subsequent step and resets the PULSE generator.

This input is primarily utilized for synchronization with an external clock, but it also proves highly useful for generating complex modulation curves within the Kastle. When the TEMPO is set significantly slower than the clock at the CLK IN, the TEMPO oscillator becomes independent, and the CLK IN only triggers the PATTERN generator. Consequently, the LFO can still be employed to modulate at slow rates.
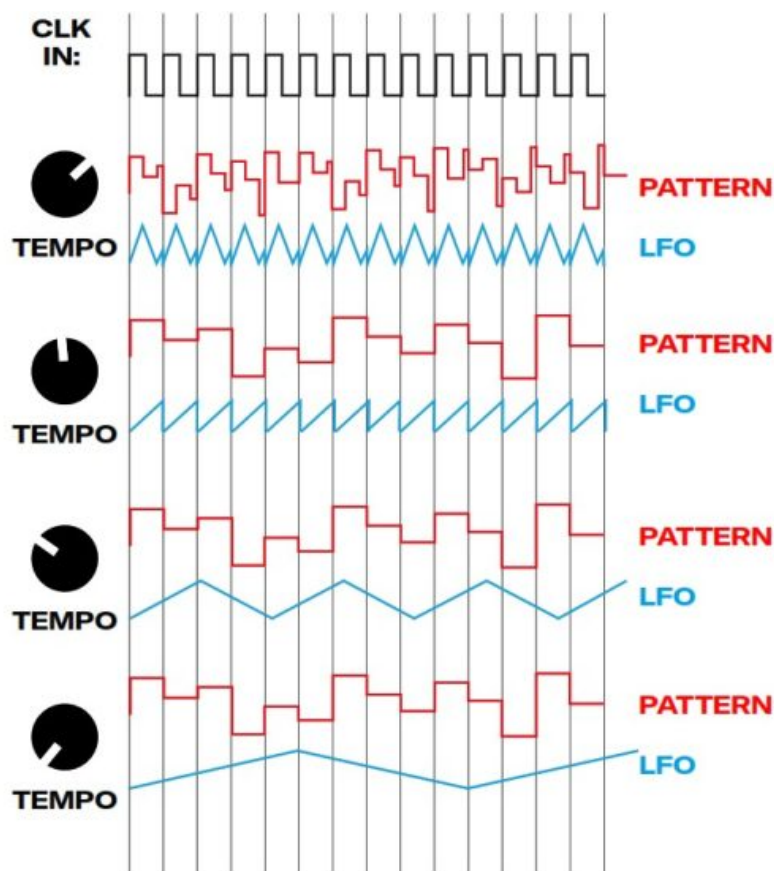
14 INPUT / OUTPUT

The I/O CV port allows for the connection of up to two modulation/audio/clock signals from the Kastle to external equipment, or the connection of any external signal for modulating the Kastle. The signals are outputted using a stereo jack, and the patch points "L" and "R" can be connected to either the Left or Right channel. To use both channels with a modular synth, a stereo to mono splitter adapter can be used, or alternatively, only one channel (L) can be used with a mono cable connected to the I/O jack. When connecting external modulation to the Kastle, it is important to note that the signal will undergo rectification, and the Kastle will only respond to signals within the

range of 0–5V.
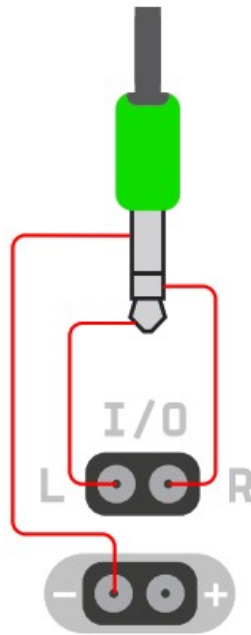
PATCH TIPS Random melody

This patch employs the skipping of notes when the DECAY knob is positioned to the left of the center, allowing the LFO generator unrestricted freedom to modulate other elements. Feed the BASS output to both the CHORD and NOTE MOD inputs.
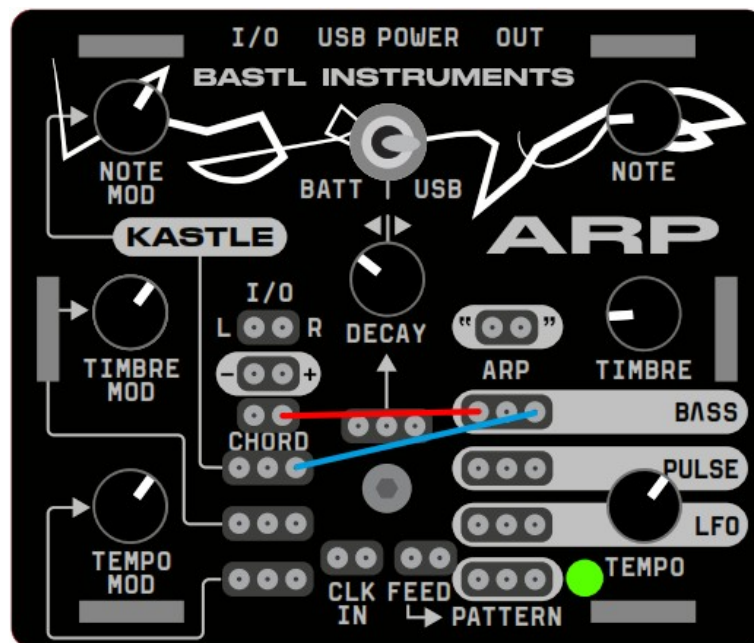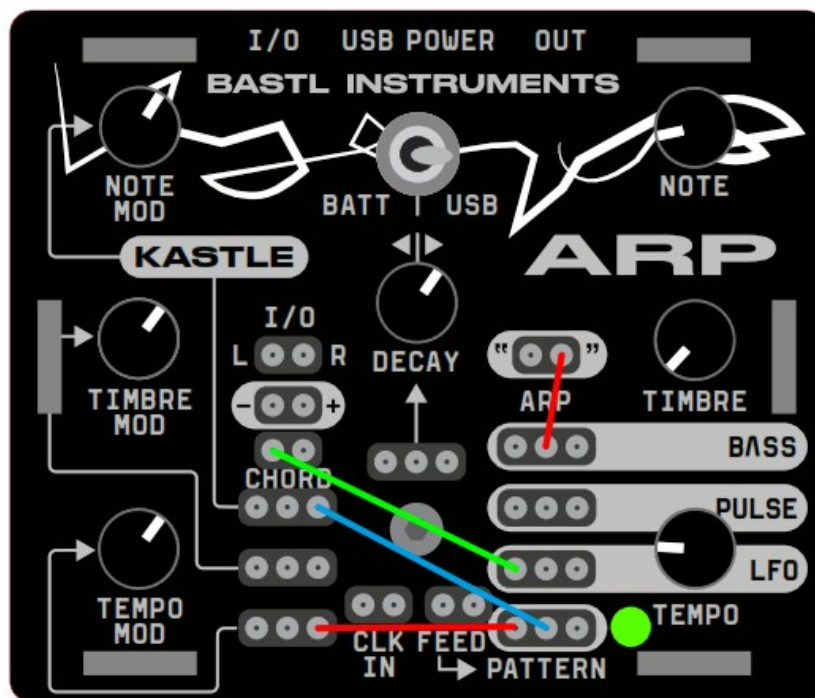

Modulation ramp

To generate an ascending ramp shape on the LFO output, patch the PULSE output to the CLK IN input. Use the LFO output to modulate NOTE MOD and utilize the PATTERN output to modulate the CHORD, thereby achieving tonal variation.
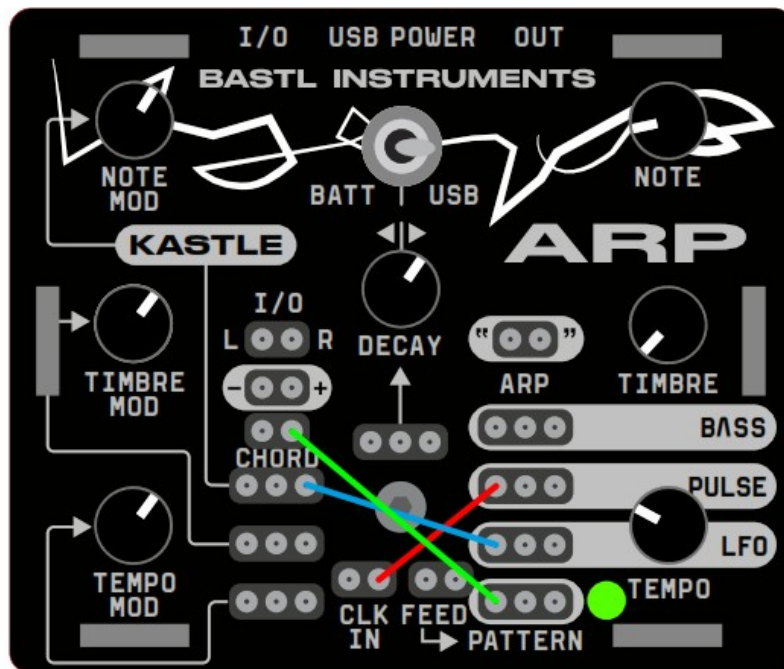
Fluid tempo

Patch PATTERN to the TEMPO MOD input and increase the TEMPO MOD knob to get varying lengths of the LFO shapes. Use the PATTERN and LFO outputs to modulate various parametres. Patch BASS to ARP to mix the signal into the main output.

Ratchet

Patch the PULSE signal into the CLK IN to generate a ramp signal on the LFO output, and patch the LFO to both the TIMBRE MOD and NOTE MOD inputs. Adjust the DECAY knob to the left of the center and allow the TIMBRE modulation to iterate multiple times before modifying the pitch of the oscillator.
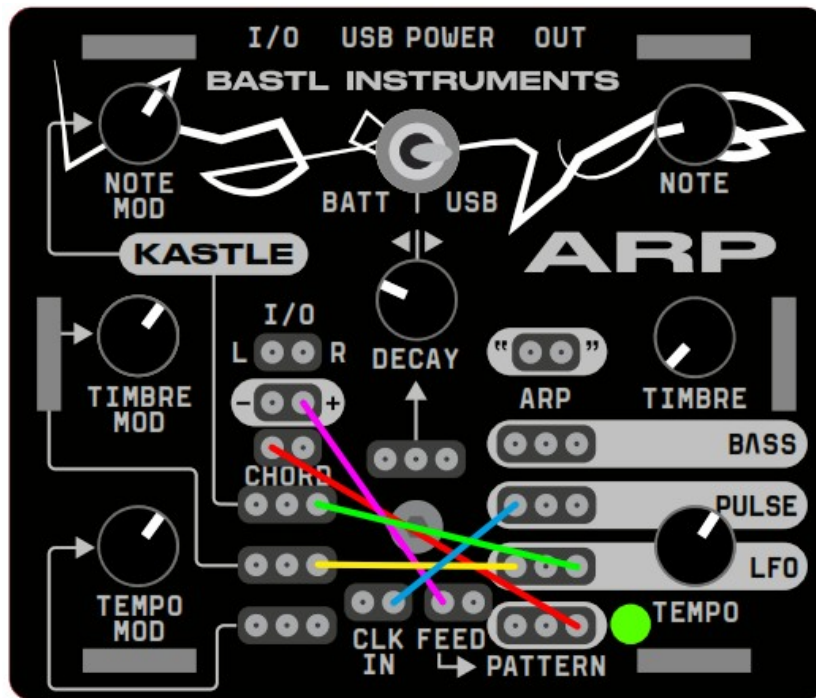
Syncing two Kastle synths

To sync two Kastles, connect the I/O ports using a jack cable. Determine which Kastle will serve as the primary clock source (Kastle Drum in the image) and connect the CLK output to the "L" patch point of the I/O socket. On the Kastle receiving the clock, connect the "L" patch point of the I/O socket to the CLK IN socket. Adjust the TEMPO of the receiving Kastle to a value lower than that of the clock source Kastle.

Note: Connecting grounds

The jack cable connection between Kastles also establishes a connection between the grounds, enabling the merging of patchbays across the Kastles. An alternative approach to creating a common ground would be connecting the two OUTs to a mixer with interconnected grounds, linking the "-" patch point of one Kastle to the "-" patch point of the other, or powering both Kastles from a shared USB power source.
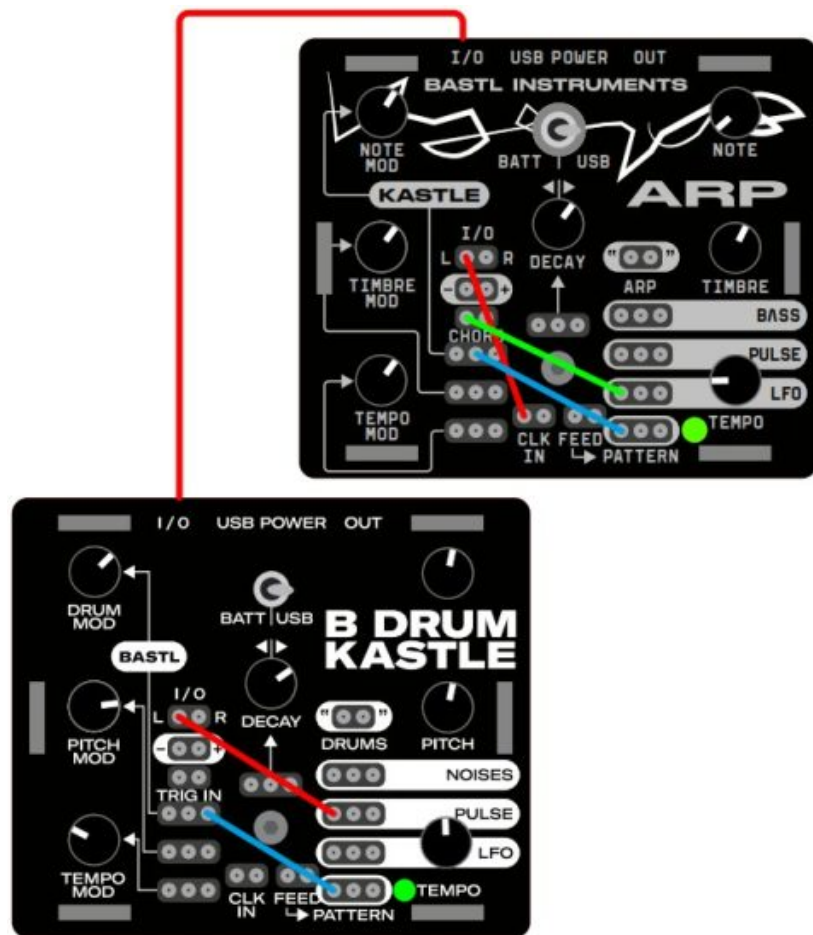
CREDITS

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The idea turned into reality thanks to everyone at Bastl Instruments and thanks to the immense support of our fans.

more info and video tutorials www.bastl-instruments.com

Documents / Resources

BASTL INSTRUMENTS Kastle ARP Unique Modular Melody Generator [pdf] Instruction Manual

Kastle ARP, Kastle ARP Unique Modular Melody Generator, Unique Modular Melody Generator, Modular Melody Generator, Melody Generator, Generator

References

- [User Manual](#)

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