FX WIZARD

BASTL INSTRUMENTS

KASTLE 2

KASTLE 2 FX WIZARD

The Kastle 2 FX WIZARD is a compact, patchable stereo multi-effects unit that empowers you to explore the limits of sound processing through modulation and modularity. Use simple yet refined stereo effects, or go nuts with modulation and immerse in a powerful glitch and sound design heaven. Instead of navigating thru preset effects, you can craft your own unique effects with dynamic behavior using modulation. The FX WIZARD embraces happy accidents, sparking excitement with unexpected and unheard sonic transformations.

There are three main categories of effects, each offering both finely controlled parameters and exciting extremes that you wouldn't typically find elsewhere:

- DELAY FX family (blue/green): Includes a clean stereo delay, a flanger with stereo chorus capabilities and some spicy extremes, and a freezer to capture and hold moments of time in a fun modular way.
- AMPLITUDE FX family (bright colors): Features an autopanner with ring modulation possibilities, a crunchy digital crusher with powerful feedback, and a rhythmic slicer that can create dynamic transients from any drone.
- PITCH-SHIFTING FX family (red colors): Contains a dirty pitcher that shifts signals up in either tonal or rhythmic patterns, a fun replayer effect that reverses audio and introduces lots of pitch-shifting artifacts, and last but not least, a nuanced shifter that adjusts the pitch up or down to achieve detuned sounds and feedback pitch slopes.

Effect parameters can be modulated using the built-in LFO or a surprisingly powerful pattern generator. For dynamic effects that respond to incoming audio (hello, ducking), there's also an envelope follower.

Each effect can widen the STEREO field by detuning some of its core, while the FILTER allows you to brighten or darken the sound. All effects react to triggers or clocks in both predictable and exciting ways.

With modulation and the right FX MODE, the gates to extreme sound design and glitch territory open wide.

FX Wizard both sends and receives USB MIDI, making studio integration a breeze! Use it as an ultra-portable knob controller for your DAW or simply sync it without any hassle.

Features

- 9 FX modes:

1. Delay	2. Flanger	3. Freezer
4. Panner	5. Crusher	6. Slicer
7. Pitcher	8. Replayer	9. Shifter

- max. delay time in stereo is 1.15s (with FW v1.1 and higher)
- stereo audio processing at 44kHz/16-bits
- Time parameter with attenuverting modulation (S&H or free)
- Feedback parameter with attenuverting modulation
- AMOUNT mix with attenuverting modulation
- FILTER in the feedback with Lowpass/Highpass
- STEREO detuning for each FX MODE
- FX MODE cv input with attenuation to change modes with CV
- TRIG input to synchronize effects with tempo
- LFO with triangle and pulse output, reset input, attenuverting modulation, synced or free
- Tempo Generator with tap tempo and divider with external clock
- Pattern Generator (tempo synced) with GATE and CV output and patch programmability
- patchable envelope follower
- stereo input with input gain (up to +12db), accepts up to 6 Vpp signal
- stereo output capable of driving headphones up to 250 Ohm
- analog sync input
- analog sync output
- USB MIDI Input (clock, notes, CCs)
- USB MIDI Output to act as MIDI controller (clock, CCs)
- USB-C (firmware updates, USB MIDI, power)
- 3x AA battery power (both rechargeable and non)
- power consumption approx. 100-150 mA, should be good for up to 15-18 hours on 3xAA batteries.

Introduction

For starters, let me tell you just one thing: **Follow the white rabbit!**
The knobs with rabbits control the main parameters of your sound. All other knobs come alive once you start patching.
The Kastle 2 FX WIZARD can be experienced in various ways. It is absolutely legit to just explore and let your ears guide you. If that's your style, you might appreciate the Quick Start guide.

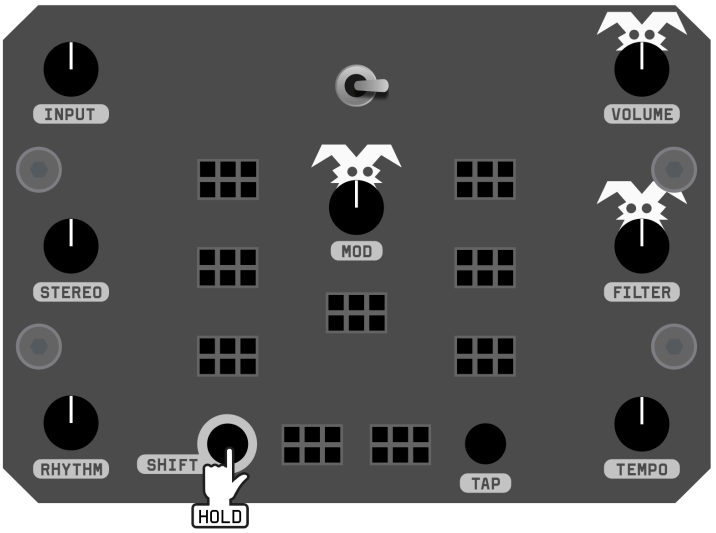
The Quick Start guide is linked here.

MANUAL

The following complete manual will give you a deeper understanding of how everything works, helping you achieve the exact results you want. It's packed with tips to show you just how deep the rabbit hole goes... so buckle up!

Shift

Hold the SHIFT button to access the silver-labeled functions. For example, hold SHIFT and turn the TIME knob to adjust the VOLUME.



Button Combos

SHIFT + KNOB = secondary function in silver
SHIFT + FX MODE = Tap tempo
FX MODE = next FX mode
FX MODE + SHIFT = previous FX mode

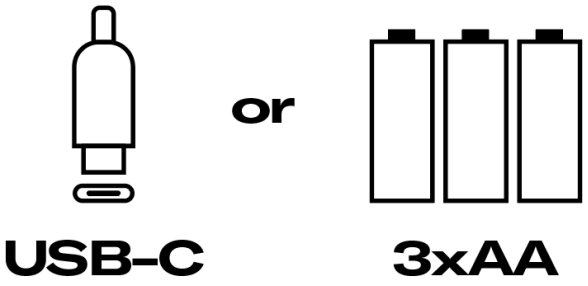
FX MODE + AMOUNT = modulation attenuation for FX MODE input
SHIFT + FX MODE >2s = enter/leave ADVANCED SETTINGS (input behavior etc.)
SHIFT + FX MODE >15s = MEMORY RESET

Connecting KASTLE 2

SHIFT + TIME MOD knob = set input gain
SHIFT + TIME knob = set output volume
SHIFT + FX MODE >5s = ADVANCED SETTINGS (input behavior etc.)

POWER

KASTLE 2 can be powered by USB-C (5V) or 3x AA batteries—either rechargeable or non-rechargeable.



Low battery levels will cause the backlight colors to turn red.
Colors and sound should still function properly down to about 3V. Power voltage levels below 3V indicate dead batteries.
Fresh non-rechargeable alkaline batteries: 3x1.5V=4.5V
Fully charged NiMh batteries: 3x1.2V=3.6V

To turn ON the device, move the Power switch to the right position. Push it to the left position to turn it OFF.

Depending on your power source the maximum output voltage of the output patch points might change. With rechargeable batteries it might only read 3.6 volts (3x1.2V) or lower when drained. With USB-C the output voltage will almost reach 5 volts (around 4.8V).

NOTE: KASTLE 2 does not charge or draw power from your batteries when connected via the USB port.

USB

The USB port is used for power, USB MIDI, and firmware updates.

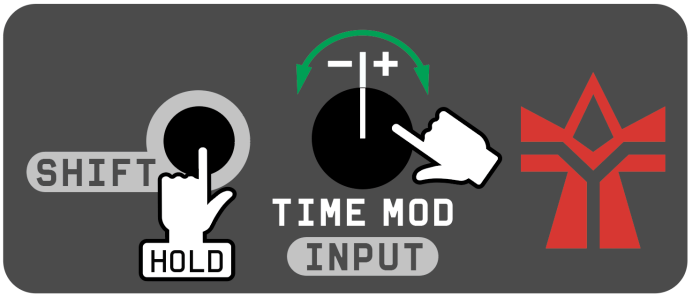
AUDIO

Connect the **AUDIO OUT** jack of the **KASTLE 2** either to headphones or further devices that receive line level audio.

👆🎛️To set the output **VOLUME** hold **SHIFT** and turn the **TIME** knob.

Connect your sound source to the **AUDIO IN** jack.

👆🎛️ To set the **INPUT gain** hold **SHIFT** and turn the **TIME MOD** knob. **Input gain** is the amount of amplification of your input signal.



While holding the SHIFT button, the signal strength is indicated by the light in the word KASTLE and when it reaches RED, it is clipping at the input, and you should lower your input gain (unless you want to go for that distortion 🤘). Keep the input gain so the signal is peaking into orange.

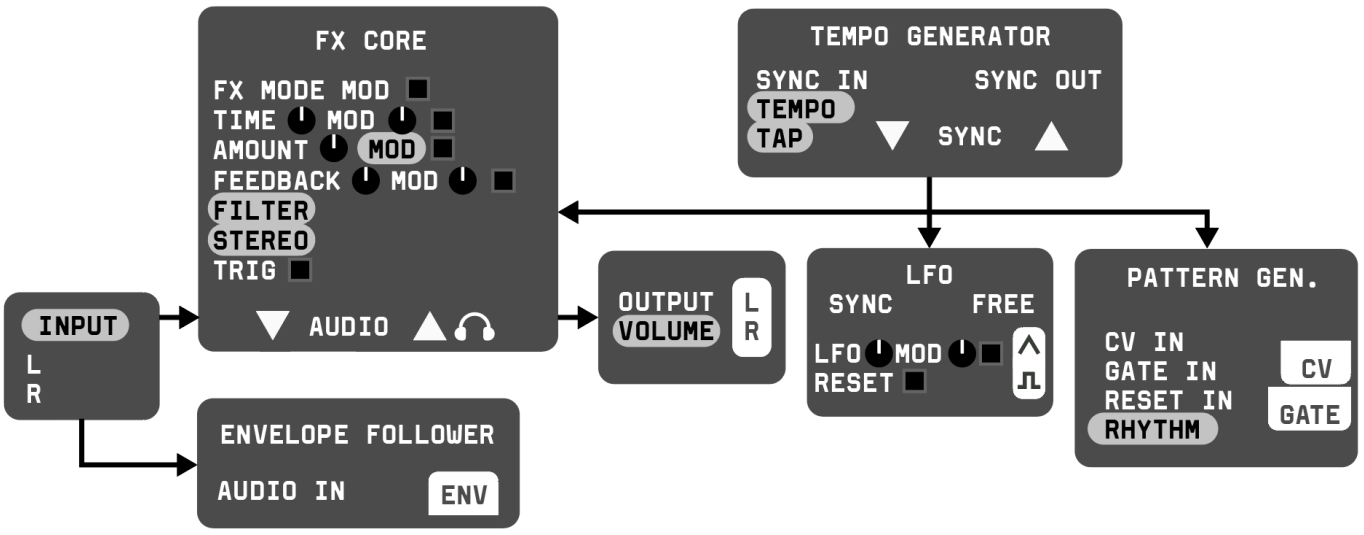
The light glows RED when clipping also when not holding SHIFT.

For the **best quality**, set the output volume of your audio source to the maximum (if using line-level or headphone output) and adjust the input gain.

NOTE: When connecting an audio signal higher than 6 Vpp (e.g. from Eurorack), the clipping might not be shown (because it already clips on the analog input before it reaches the digital codec). If you want to use a signal higher than 6 Vpp, you need to attenuate it first externally.

DUNGEON MAP

This diagram shows the building blocks of the Kastle 2 FX Wizard and where each control belongs.
Each section has a dedicated chapter in the manual.

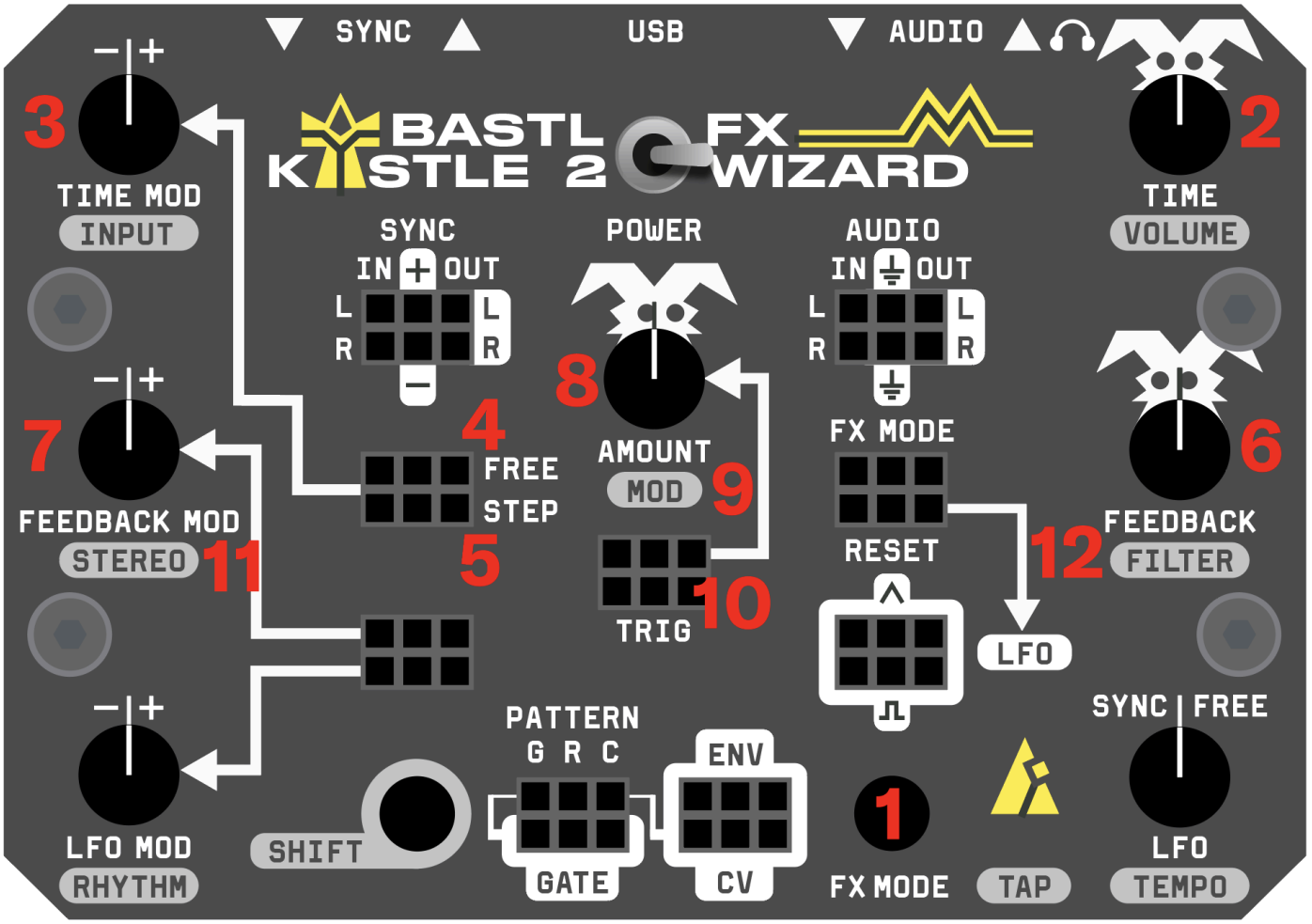


FX CORE

Shortly press FX MODE to cycle through the effects.
Each FX MODE has a color attached and has 3 main parameters - knobs with the white rabbit - that can be modulated: TIME, FEEDBACK and AMOUNT and two more hidden parameters: FILTER and the STEREO widening. There is also TRIG input for aligning the effects with tempo or triggering them rhythmically.

Main sound controls

These are the main controls that affect the sound:



1. **FX MODE** changes the mode/effect and all other parameters change function slightly based on the mode. Find all the modes listed with specific details in the [FX Modes] section.
2. **TIME** sets the main time parameter for each effect - often perceived speed or repetition rate or as frequency.

3. **TIME MOD** knob sets how much modulation from the TIME MOD patch points (white arrow towards the knob) is being applied to the TIME parameter. In the middle of the knob there is no modulation. To the right the modulation modulates in positive way and to the left it modulates in negative way.
4. The **FREE** TIME MOD patch point modulates the TIME parameter real time.
5. The **STEP** TIME MOD patch point modulates the TIME parameter only with tempo clock creating stepped modulation as if you were using sample & hold.

6. **FEEDBACK** is the unique parameter here - it interacts with the input signal and creates an organic feedback tone that also interacts with the effect itself. The loudness of your incoming audio matters so you can shape the feedback responsiveness or dominance by adjusting your input gain.
7. **FEEDBACK MOD** knob sets how much modulation from the FEEDBACK MOD patch point (white arrow towards the knob) is being applied to the FEEDBACK parameter. In the middle of the knob there is no modulation. To the right the modulation modulates in positive way and to the left it modulates in negative way.

8. **AMOUNT** typically sets how much effect is applied. Fully left this knob turns off any effect and you should hear a clean signal.
9. **AMOUNT MOD** input modulates the AMOUNT knob. To set how much it is being modulated hold SHIFT and turn the AMOUNT knob. In the middle of the knob there is no modulation. To the right the modulation modulates in positive way and to the left it modulates in negative way.

10. **TRIG** input is to align the effect better to the tempo.

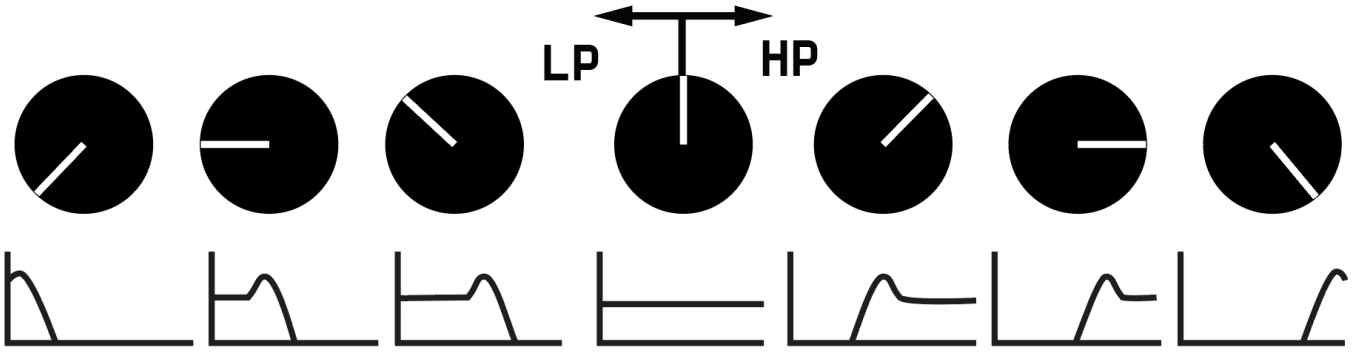
Stereo

11. You can get a radical **STEREO** image by detuning the main TIME parameter.

Hold SHIFT + FEEDBACK MOD knob = STEREO detune of the TIME parameter

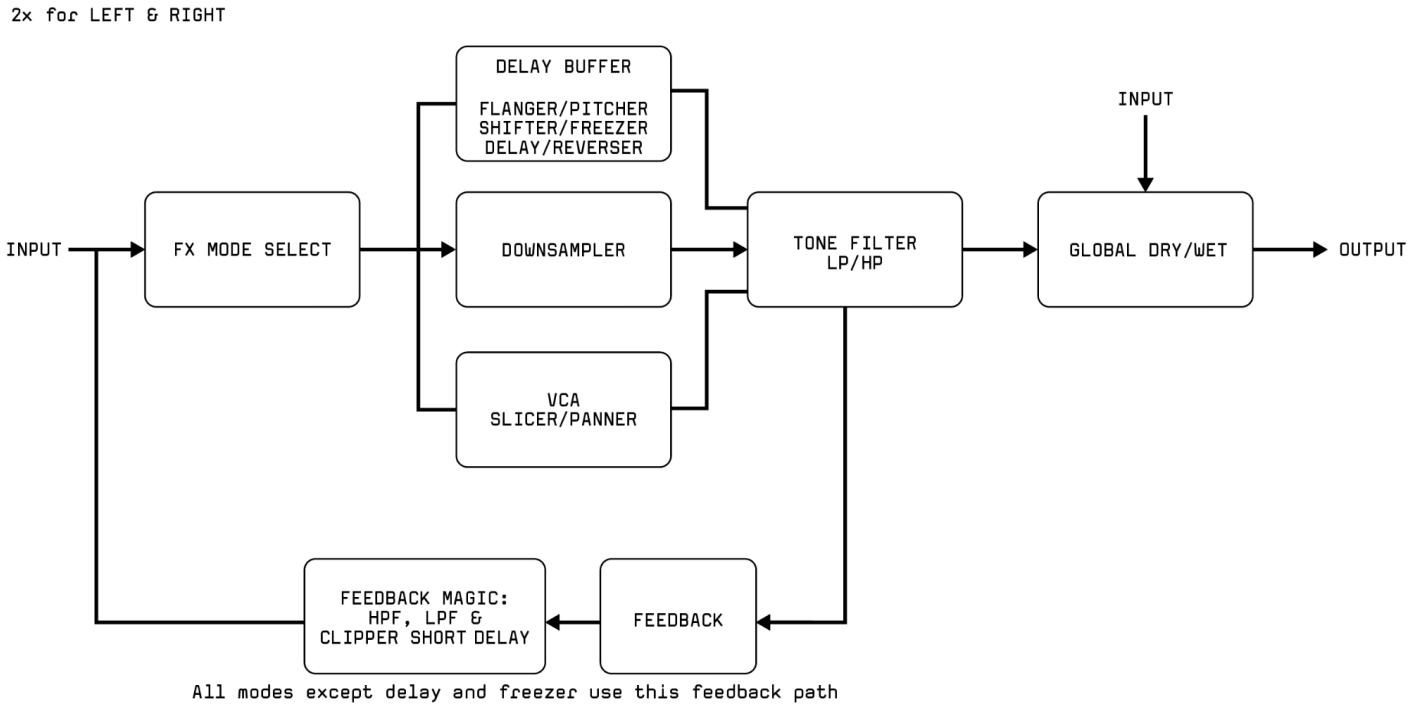
Filter

12. There is also a **FILTER** to make your effects darker or brighter. The FILTER is in the feedback path and interacts with the feedback tone and the effect itself.
    Hold SHIFT+ FEEDBACK knob = FILTER
    In the middle, the filter is open, to the left it acts as a lowpass filter and to the right it becomes a highpass filter.



Signal flow

Here is the block diagram of the FX Core of Kastle 2 FX WIZARD



FX MODEs

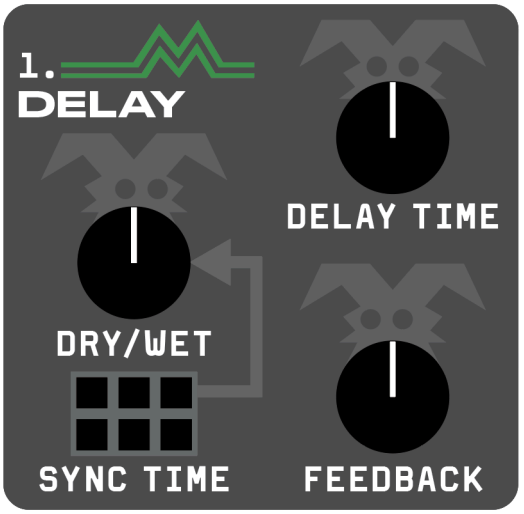
To change the FX MODE to the next one, press the **FX MODE** button. The color on top of Kastle 2 will change to indicate the selected mode. To go back to the previous FX MODE, **hold** the **FX MODE** button and **press** the **SHIFT** button.

You can also change the FX MODE automatically by modulating the **FX MODE** patch point. FX MODE changes via the patch point are always **quantized to tempo**. If FX MODE modulation doesn't work, make sure a tempo is running.

Hold **FX MODE** and turn the **AMOUNT** knob to set attenuation of the FX MODE input.

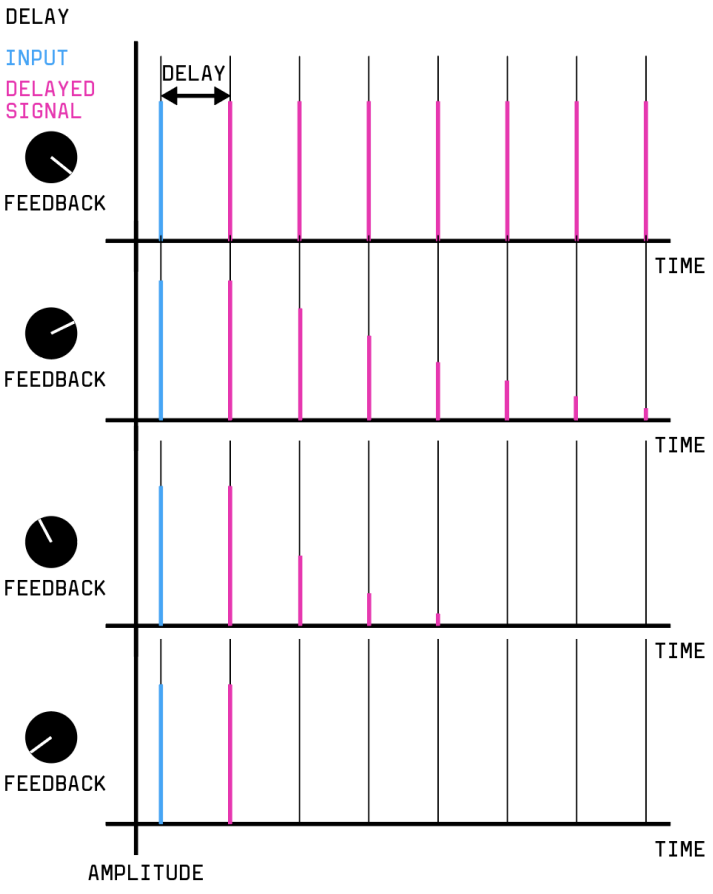
TIP: Use attenuation to switch between two specific effects with GATE or LFO PULSE, or to select different modes when modulating with CV.

DELAY (GREEN)

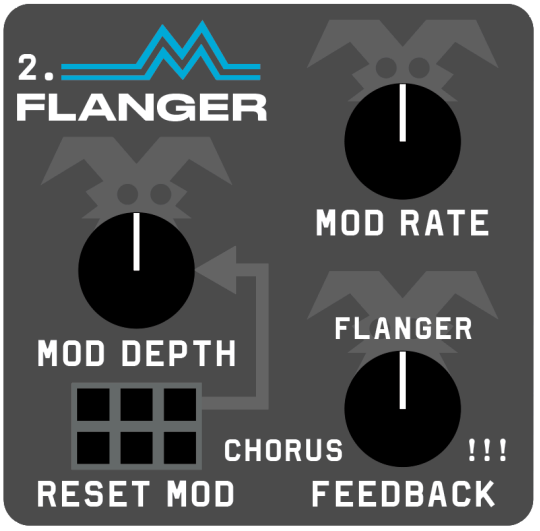


Creates classic delay effect and plenty other effects based on a delay (see patch tips).

TIME knob sets the delay time from longest to the left (1.15s) to shortest (2ms) to the right
AMOUNT knob controls the mix between the original and delayed signal.
FEEDBACK increases the number of repeats and the length of the echo. Due to implementation limits, it uses feedback before FILTER.
STEREO detunes delay time for left and right channel.
TRIG can be fed by a clock signal (e.g. from SYNC OUT on SYNC IN) to sync the delay time—when detected, the TIME knob snaps to the closest time division/multiplication of the arriving clock and the mode lights dip in brightness to indicate sync.
The divisions/multiplications for synced delay are as follows: 1/256, 1/128, 1/64, 1/32, 1/16, 1/12, ⅛, ⅙, ¼,⅓. 2/3, ½. 1, 2, 3/2, 3, 4, 6, 8, 12, 16, 32 . However, they can only reach delay times between the longest (1.15s) and shortest (2ms) delay time.



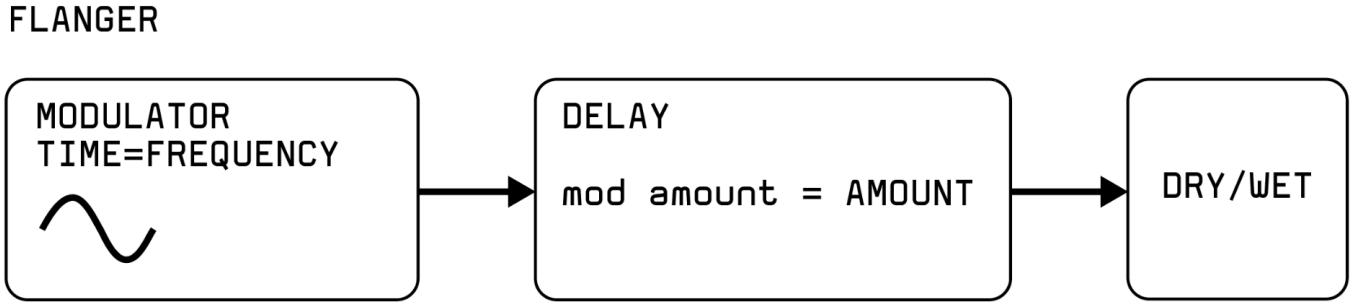
FLANGER (CYAN)



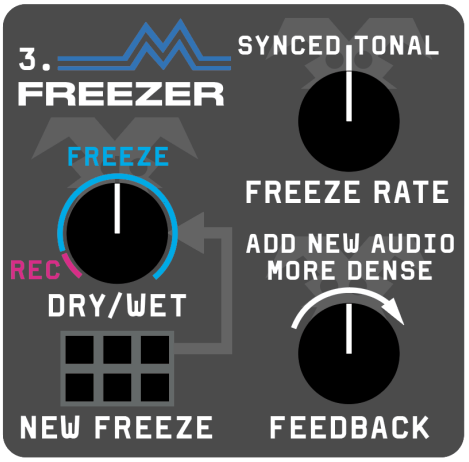
Flanger mode animates your sound in subtle or more intense ways creating chorus effect with AMOUNT in the middle and flanger effect with FEEDBACK applied.

TIME knob sets the modulating frequency.
AMOUNT knob sets the amount of ramp modulation of the delay time—increasing the pitch shift and controls local and global dry/wet amounts.
FEEDBACK is the global feedback.
STEREO detunes the modulating frequency for the left and right channel.
TRIG resets the modulator.

The Flanger works by sine wave modulating delay time resulting in slight pitch modulation.



FREEZER (BLUE)



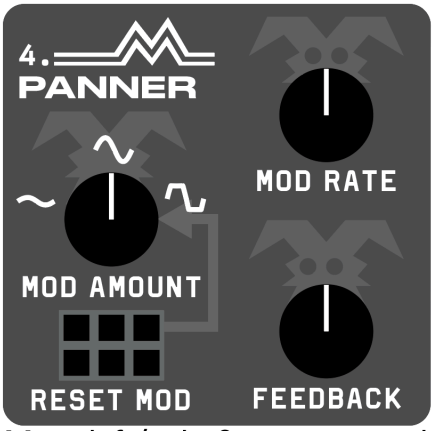
Uses the delay buffer to freeze a chunk of audio after it has been activated. With longer times, it is synced to tempo, creating rhythmic repeats; with faster times, it becomes tonal and freezes timbral components of incoming signal.

There are 3 ways of how you can freeze a new chunk of incoming audio:

1) you enter the freeze mode (either by browsing with the FX MODE button or by modulating the FX MODE input)
2) you transition from zero AMOUNT to non-zero AMOUNT
3) you trigger the TRIG input

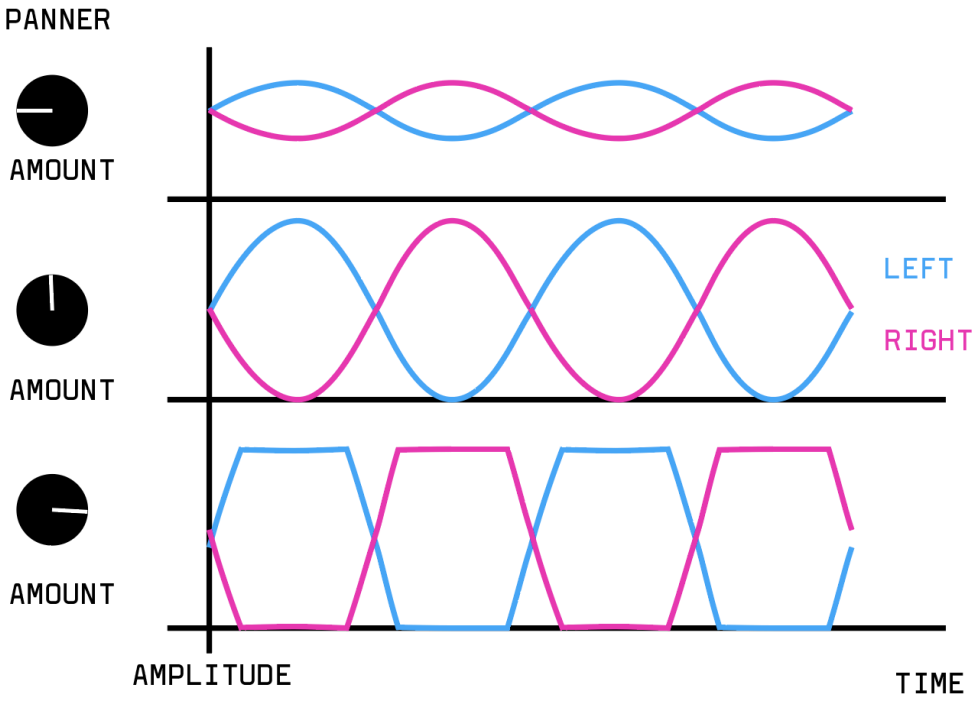
TIME knob sets the repeat time—to the left, it becomes tempo divisions for rhythmical freezes, and to the right, it becomes tonal.
AMOUNT knob controls local and global dry/wet amounts and freezes new audio when leaving the minimum setting.
FEEDBACK feeds some more incoming audio into the frozen buffer to increase its density (does not use the main feedback path).
STEREO detunes the left and right channel repeat/freeze time.
TRIG freezes a new chunk of incoming audio.

PANNER (WHITE)

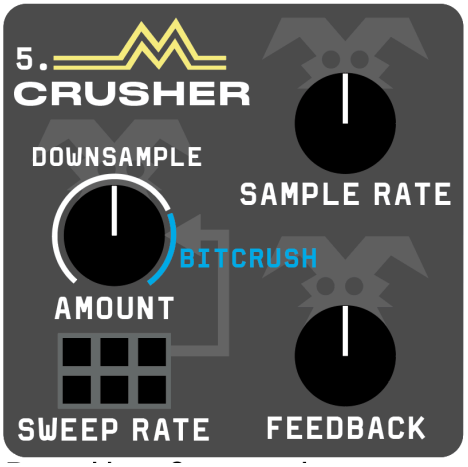


Modulates amplitude of the signal in inverse phase for left and right channel therefore creates panning of the signal from left to right.

TIME knob sets the panning frequency— goes up to audio rate creating stereo ring mod effect.
AMOUNT knob sets the amount of the amplitude modulation—clipping the sinewave into a squarewave for more radical panning.
FEEDBACK is the global feedback.
STEREO detunes the left and right channel panning frequency.
TRIG resets panning modulator.

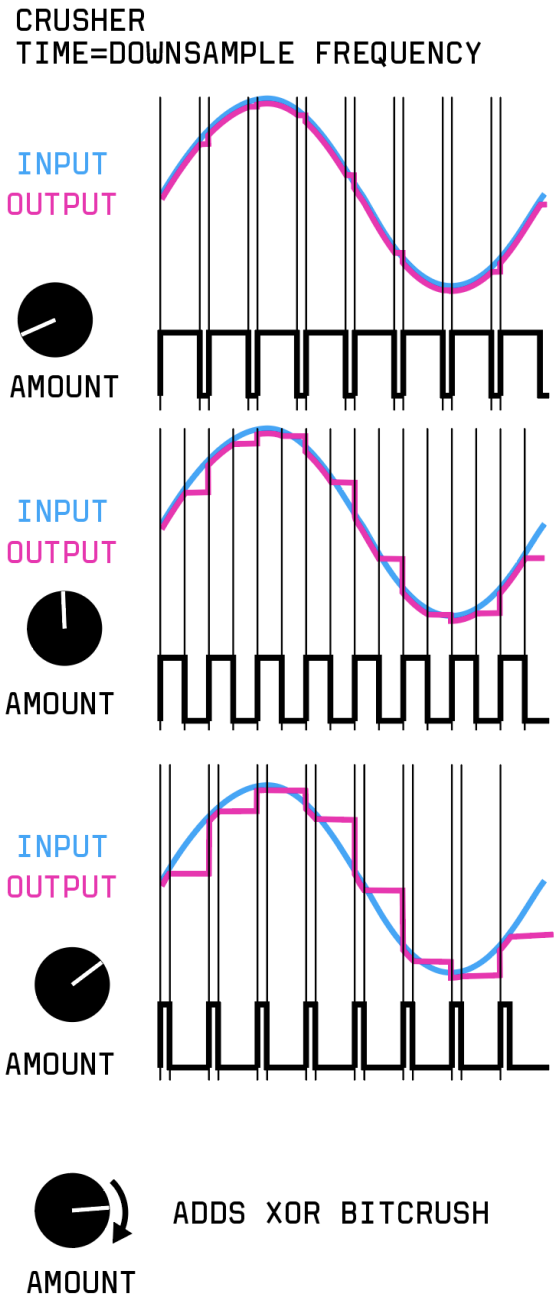


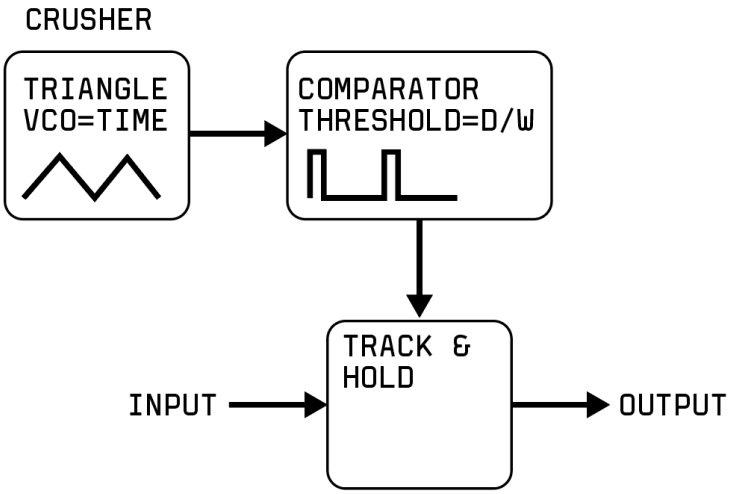
CRUSHER (YELLOW)



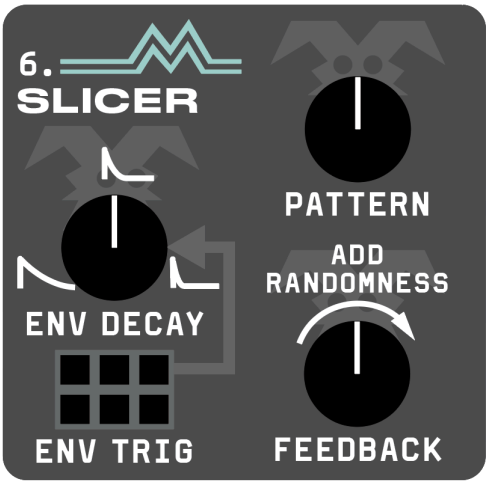
Introduces downsampling effect and manipulates bits to achieve rich bitcrushing.

TIME knob sets the downsampling frequency.
AMOUNT knob sets the intensifying of the downsampling effect and adds XOR bitcrushing towards the right.
FEEDBACK is the global feedback adding distorted tonal backdrop.
STEREO detunes the left and right channel downsampling frequency.
TRIG triggers an envelope that dips the downsampling frequency temporarily.



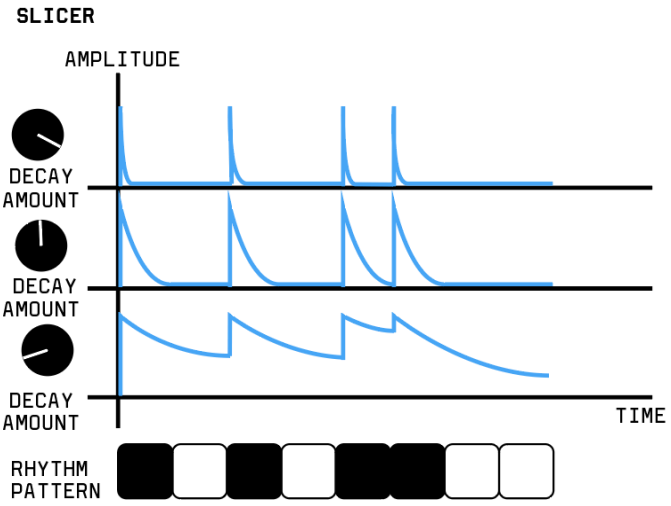


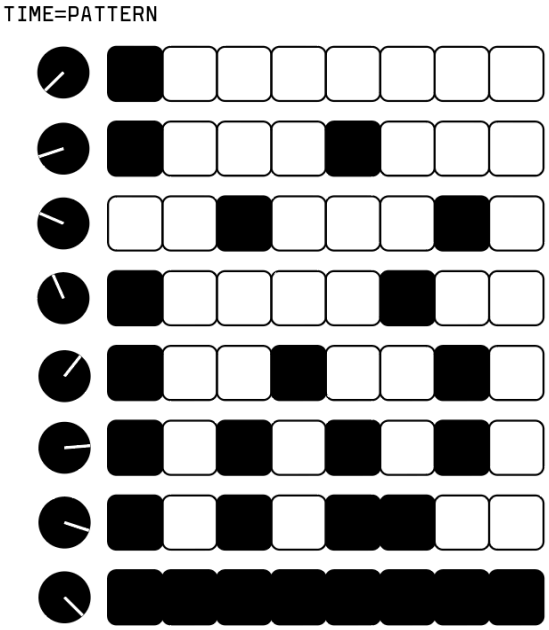
SLICER (LIGHT GREEN)



Slicer effect with rhythmical chops.
Internal rhythm sequencer (synced to tempo) triggers slicing decay envelope modulating the amplitude of the signal.

TIME knob sets the trigger pattern for the slicing envelope.
AMOUNT knob sets the DECAY of the envelope (long to the left, short to the right) and controls local and global dry/wet mix.
FEEDBACK adds probability of randomly inverting triggers adding randomness to the pattern and adds global feedback.
STEREO sets a different pattern for the left and right channel.
TRIG triggers the slicing envelope.

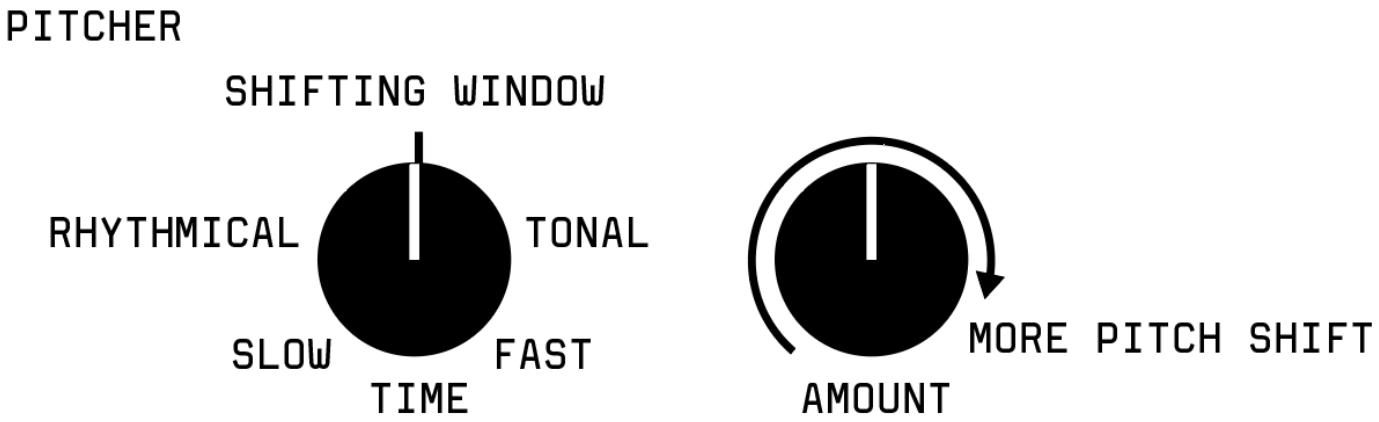


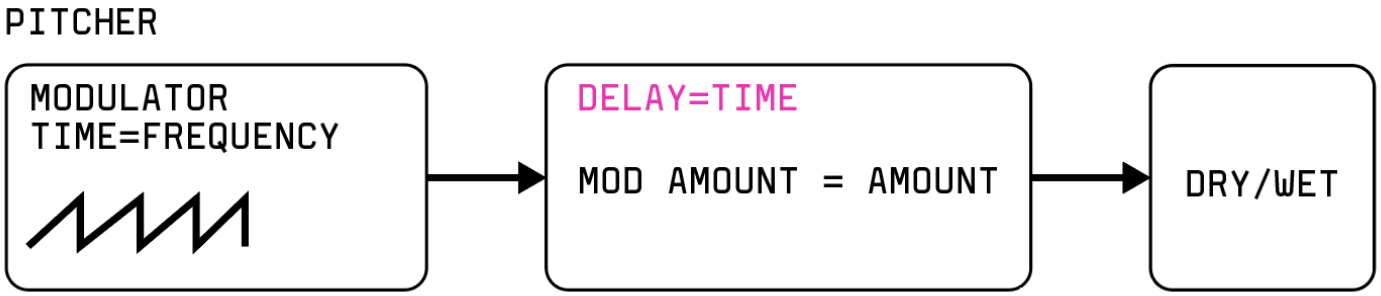


PITCHER (RED)

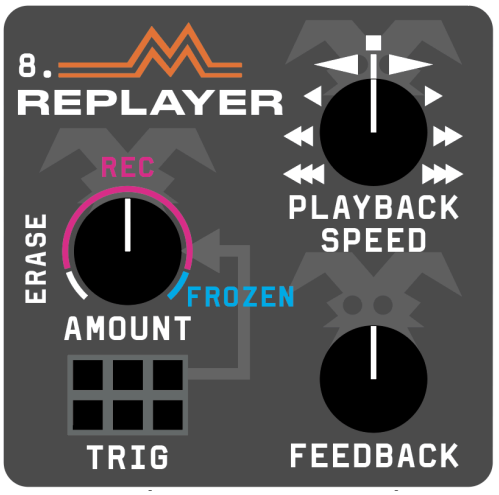
RAMP modulation or delay buffer to achieve crude pitch-up shifting effect, with rhythmical chops with slow TIME and formant shifts with faster TIME.

TIME knob sets the size of the shifting window. Can be seen as modulation speed or grain size.
AMOUNT knob sets the amount of ramp modulation of the delay time—increasing the pitch shift and controls the dry/wet mix.
FEEDBACK is the global feedback.
STEREO detunes the modulating frequency for the left and right channel.
TRIG triggers an envelope that temporarily enlarges the shifting window.



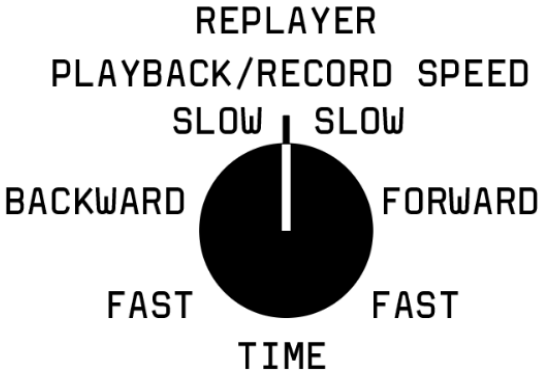


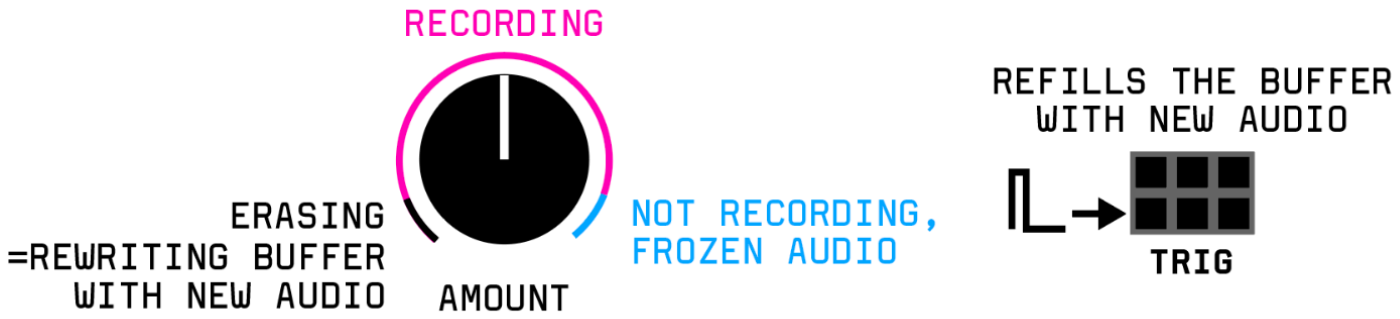
REPLAYER (ORANGE)



Tape looper emulation.

TIME knob sets how fast and in which direction the “tape” runs. To the left, it runs backwards; to the right, it runs forwards. This is for both **recording** and **playback**.
AMOUNT knob controls both the output and the buffer input - turn it all the way right to lock the buffer completely, going more dry allows more signal to be recorded and added to the already existing audio in the buffer. The knob position determines the volume of new signal and the existing signal (all the way dry makes the existing audio go away completely).
FEEDBACK is the global feedback but only for the incoming new signal, not the output.
STEREO detunes tape loop speeds for each channel.
TRIG fills the entire buffer with new audio.





SHIFTER (PINK)

Different approach to pitch shifting than the pitcher that avoids the "transient duplication".

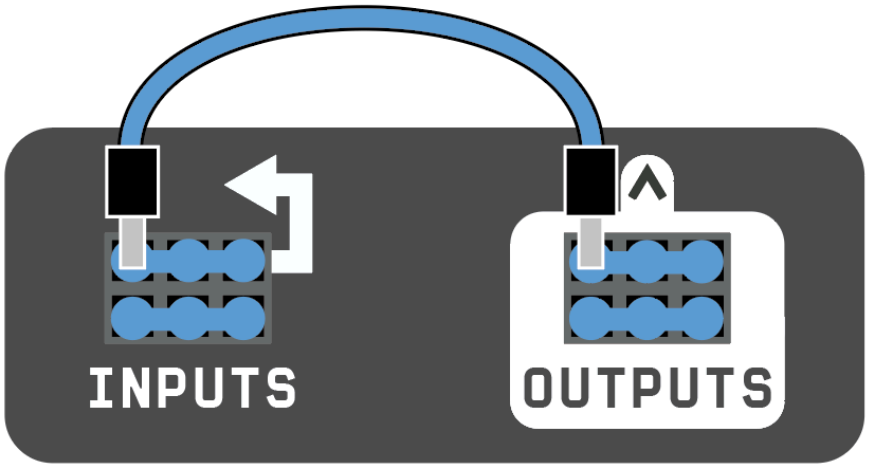
TIME knob controls how the pitch changes; above middle is higher, below middle is lower
AMOUNT knob controls the global dry/wet.
FEEDBACK controls the global feedback (makes cool noises when the pitch shift is just slight and the input signal goes away).
STEREO changes the pitch shift amount for each channel.
TRIG briefly resets the stereo effect by syncing the controlling LFOs.

PATCHBAY

The **Patchbay** on the **KASTLE 2** consists mainly of triple patch points, where the three horizontal points are interconnected.

Exceptions:

- **AUDIO** and **SYNC** labeled connectivity patch points.
- **PATTERN GENERATOR** inputs, where each patch point serves a unique purpose.



Patchbay Details

- **Outputs**: Marked with a white outline and labeled within the outline.
- **Inputs**: Labeled with white text or white arrows pointing towards their respective modulation destinations. Inputs do not have a white outline.

Compatibility

The patch points are 0–5 volt compatible:

- **Inputs** accept voltages between 0 and 5 volts.
- **Outputs** can output between 0 and 5 volts or less, depending on the power source.

Connections

Typically, **Outputs** are connected to **Inputs**, but multiple Outputs can be connected to a single Input. The patchbay is designed to combine signals, so don't worry—it's built to handle this without causing any issues.

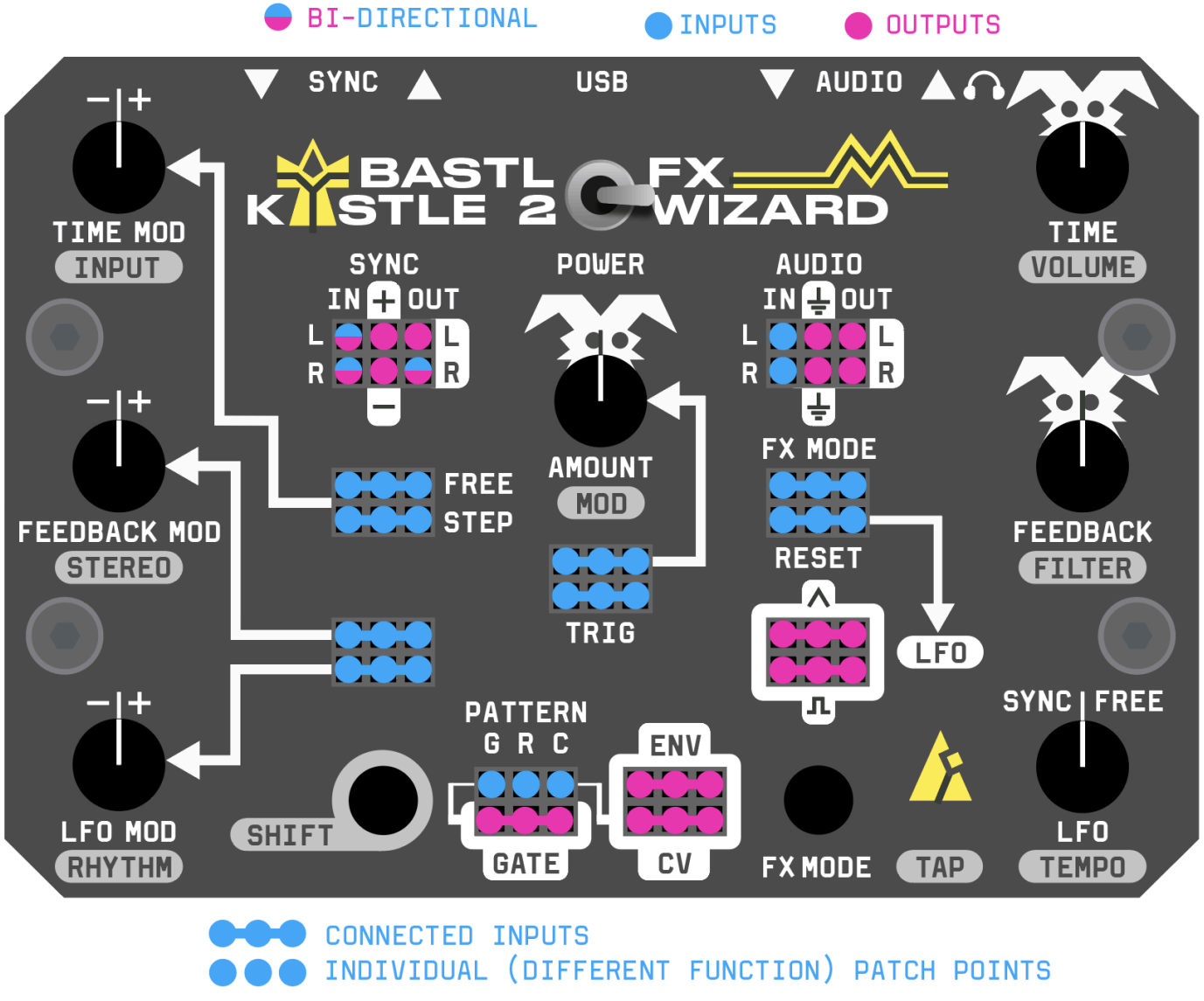
Bi-Directional Patch Points

There are three **Bi-Directional patch points** that can be used for sending signals in or out of the **KASTLE 2** via the **TRS jacks** located at the back.

- **Plus (+)**: Represents a logic high output (~5V).
- **Minus (-)**: Represents a logic low output (~0V).
- Both outputs are resistor protected, so patching them together results in a combined voltage of approximately 2.5V.
- **Ground Symbol (⏚)**: Serves as a direct ground reference, ideal for interfacing with multiple devices, breadboards, etc.

NOTE: When patching multiple **Kastles** or devices with compatible headers, it is essential to connect the grounds of all devices.

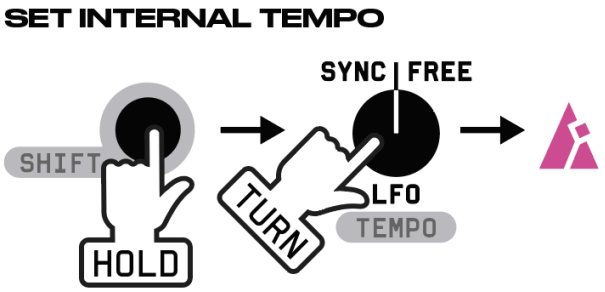
- This connection happens automatically when using **audio** or **sync jacks**.
- If you wish to avoid this, use the **Ground symbol (⏚)** patch point and connect it to the **ground** or **minus (-)** patch point on the other device.



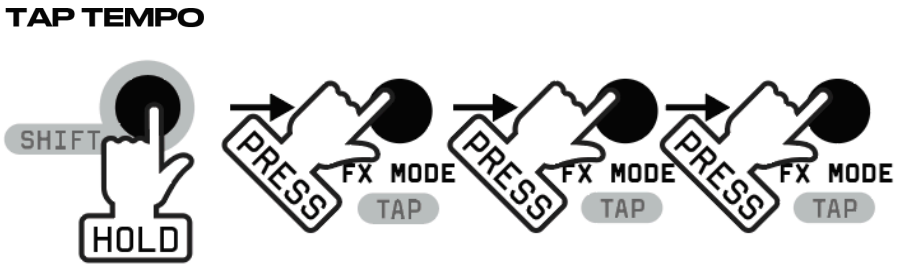
TEMPO GENERATOR

The **Tempo Generator** operates independently from the **LFO** but allows the **LFO** to be synchronized to the tempo. The tempo source can be either internal or external.

Set the Internal Tempo



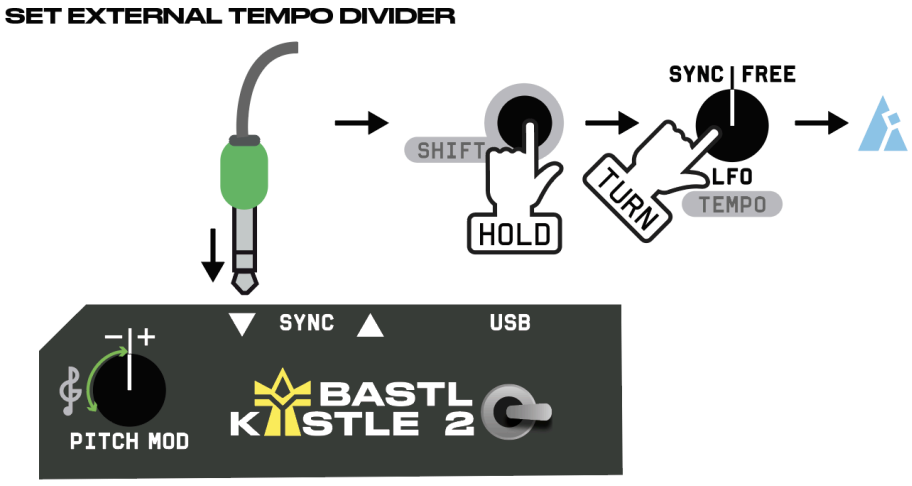
👆🎛️ Hold **SHIFT** and turn the **LFO knob**, indicated by the magenta-colored metronome light.



👆👆 Hold **SHIFT** and press **FX MODE** repeatedly to **TAP** the tempo.

Sync to External Tempo

Connect an analog clock signal to the **SYNC IN**.



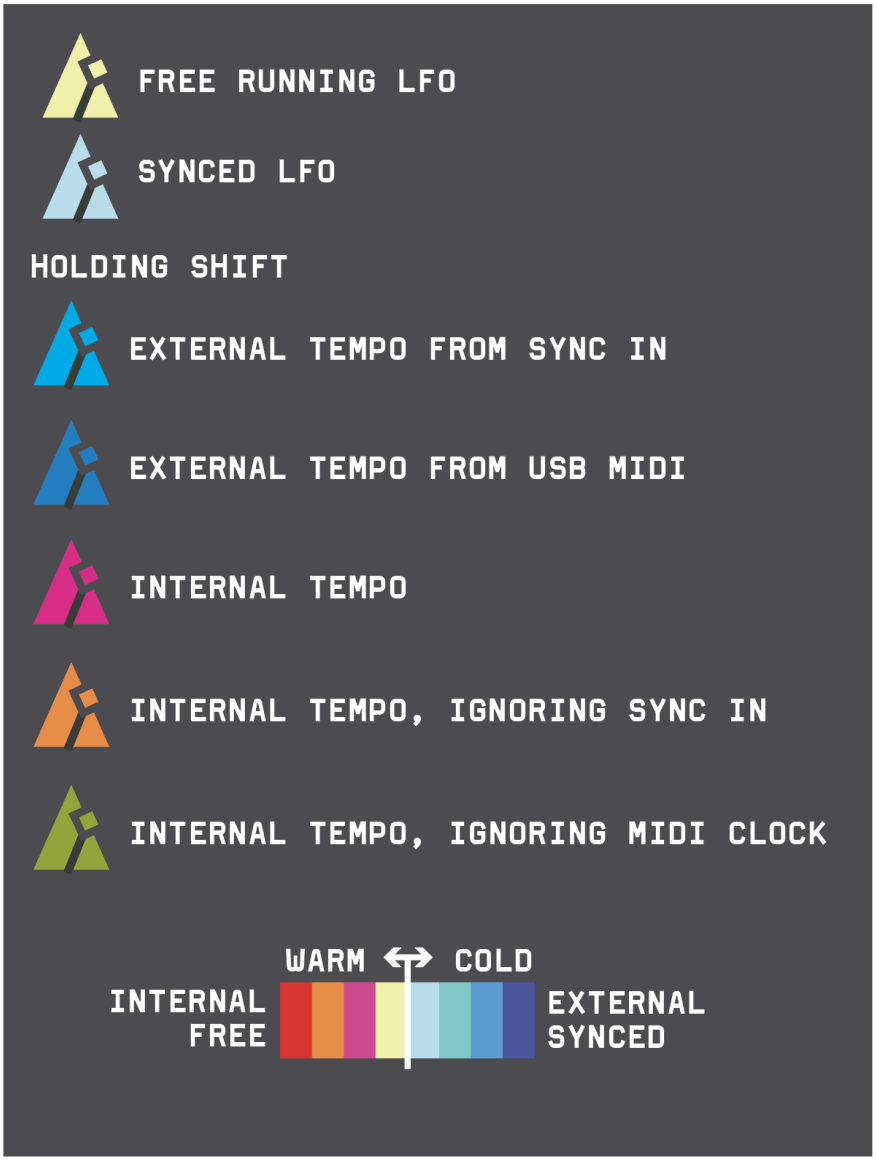
👆🎛️ Hold **SHIFT** and turn the **LFO knob** to select the tempo divider, indicated by the cyan-colored metronome light.

While holding the **SHIFT button**, the metronome light indicates the clock status:

- **Light blue (cyan)**: External tempo is active.
- **Light pink (magenta)**: FX Wizard is running on the internal clock.
- **Blue:** FX Wizard is running on a USB MIDI clock. See the **USB MIDI** section for more info.
- **Orange**: FX Wizard is using the internal clock and ignoring the external analog clock.
- **Khaki:** FX Wizard is using the internal or external clock and ignoring the MIDI clock

NOTE: The regular clock priority is: USB MIDI clock, over the SYNC IN, over the internal clock.

NOTE: To toggle between allowing or ignoring the external clock or MIDI clock, refer to the **Advanced settings** section.



SYNC

SYNC IN

To sync the **KASTLE 2** to an external clock, connect an analog clock source to the **SYNC IN** jack. The clock signal will be detected on the left channel of the jack and used as the tempo source.

While holding the **SHIFT button**, the metronome light blinks **light blue (cyan)** to indicate that external tempo is active.

Adjust the tempo divider/multiplier by holding **SHIFT** and turning the **TEMPO knob**.

If the clock signal is not detected for more than 2 seconds, the **Pattern Generator** will reset to its first step, ensuring alignment with your external sequencers when the clock resumes.

NOTE: When the **SYNC IN** jack is connected, the **KASTLE 2** will always wait for the external clock and will not switch to the internal clock—unless the external clock is set to be ignored. See the **Advanced settings** section for more details.

If a jack cable is not connected to the **SYNC IN** jack, you can instead patch a clock signal to the **SYNC IN** patch point in the **patch bay**. If a clock is detected there, the **KASTLE 2** will automatically sync to that clock.

When the clock patched through the **patch bay** is not detected for more than 2 seconds (while no jack is connected to **SYNC IN**), the **KASTLE 2** will switch back to its internal clock.

NOTE: When connecting the **LFO PULSE output** to the **SYNC IN patch point**, ensure the **LFO knob** is in the free (unsynced) section to avoid glitches.

SYNC OUT

Connect **SYNC OUT** to the clock input of a receiving instrument to synchronize it with the clock of **KASTLE 2**.

You can set the **TEMPO** on the **KASTLE 2** by holding **SHIFT** and turning the **LFO knob**.

Additionally, you can patch from the **SYNC OUT** patch point to various inputs.

SYNC THRU

When an external clock is connected to the **SYNC IN**, the **SYNC OUT** acts as a **SYNC THRU**. While you can adjust clock dividers/multipliers on the **KASTLE 2**, all downstream devices will remain synchronized with the master clock.

USB MIDI sync

KASTLE 2 can be synced to USB MIDI clock. Please see the **USB MIDI** section for more information.

Right Channel Routing

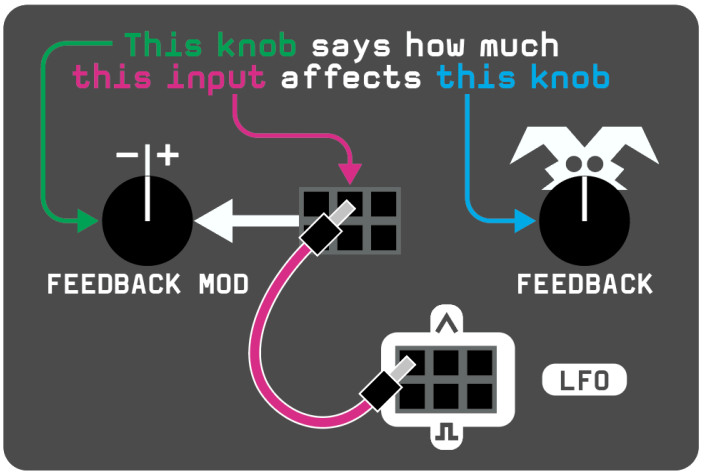
The right channels on the **SYNC IN** and **SYNC OUT** jacks are routed to the **SYNC IN R** and **SYNC OUT R** patch points. These can be used for sending or receiving other control signals.

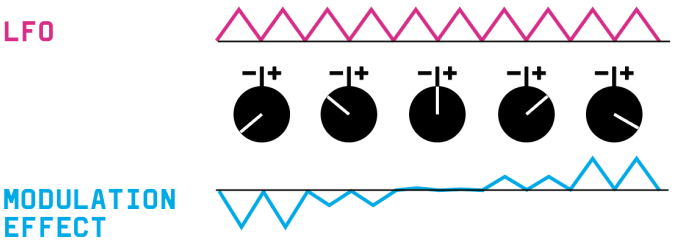
Refer to the **Modular Connections** section for more details.

MODULATION

The **KASTLE 2** features several modulation sources:

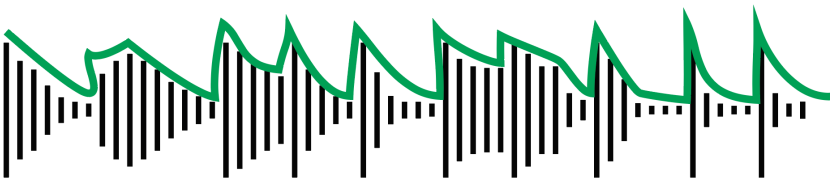
- The **Pattern Generator** is always synced to the tempo.
- The **LFO** can operate in either synced or free mode.
- The **ENV** serves as the primary envelope applied to the samples.





Envelope Follower

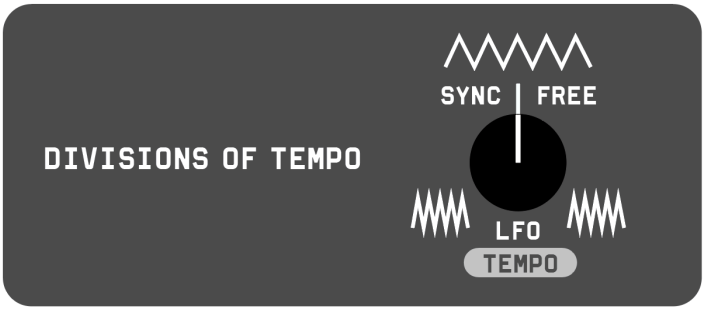
The **ENV** output is an envelope follower representing the loudness of the input signal.



LFO

The **LFO speed** is adjusted via the **LFO knob:**

- At the **middle position**, the LFO operates at its slowest speed.
- Turning the knob **left syncs** the LFO **to the tempo**, indicated by **cold white light**, with the knob setting the tempo divider.
- Turning the knob **right sets** the LFO to **free-running mode**, indicated by **warm white light**, with increasing speed as the knob turns further.



LFO Outputs and Inputs

LFO offers **TRI** and **PULSE** outputs, **RESET** input and **LFO MOD** input.

- **LFO TRI**: The triangle shape is variable by patching **LFO PULSE** to **RESET** or **LFO MOD** (see below).
- **LFO PULSE**: Outputs a high signal when the triangle is rising.
- **LFO RESET**: The rising edge resets the LFO to the highest point of the triangle waveform.
- **LFO MOD**: Attenuverting input allows for variable LFO shapes when **LFO PULSE** is patched into it.

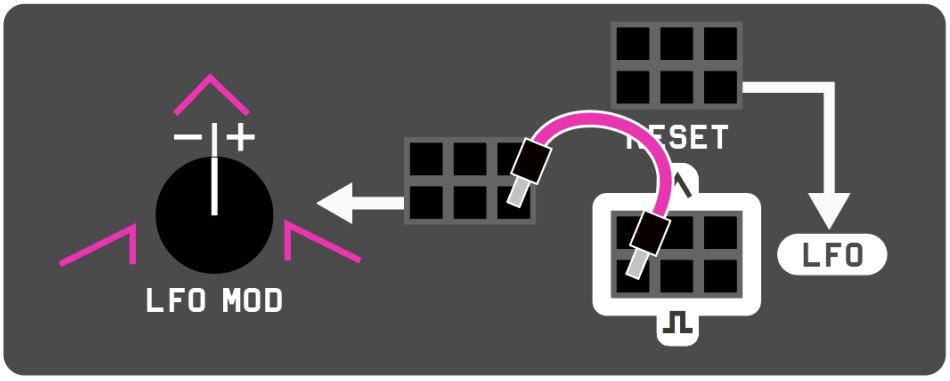
NOTE: Modulation does not switch between synced and free LFO modes but only speeds up or slows down the LFO.

Changing Modulation Shapes

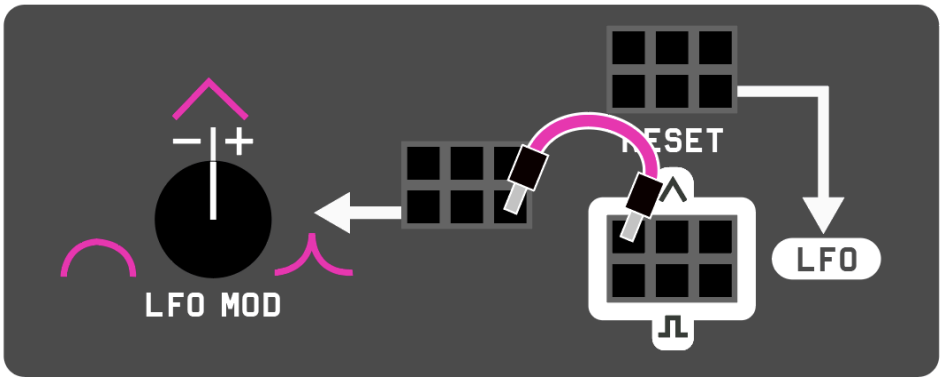
Modulation shapes can be adjusted through **patch programming**.
NOTE: The following methods will also affect the LFO speed.
The **LFO PULSE** output changes its pulse width, remaining high while the triangle rises and low while it falls.

LFO Patch Programming variants

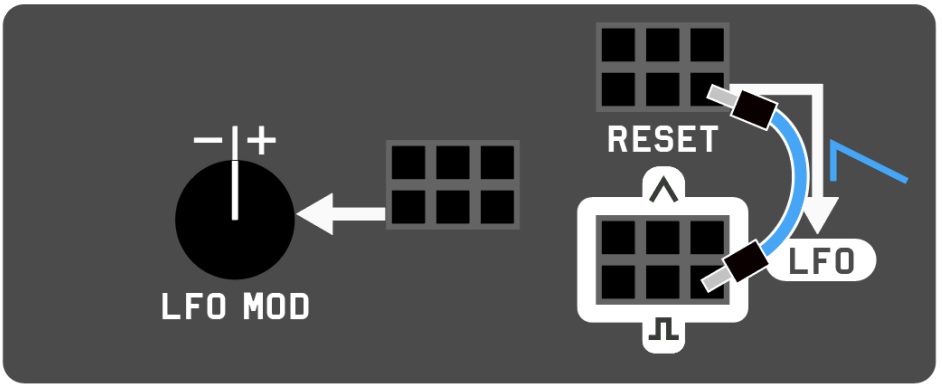
- **Ramp or Saw Shape**:
  Patch the **LFO PULSE** to the **LFO MOD input** and adjust the **LFO MOD** to tilt the triangle into a ramp or saw shape. Adjust the **LFO knob** to fine-tune the result, as turning the **LFO MOD** will affect the LFO frequency.



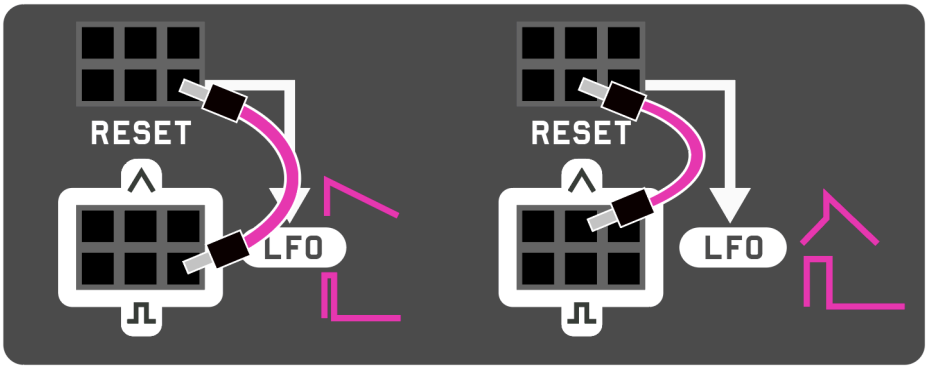
- **Exponential or Logarithmic Shape**:
  Patch the **LFO TRI** to the **LFO MOD input** and adjust the **LFO MOD** to make the triangle shape more exponential or logarithmic.



- **Saw Wave Shape**:
  Patch the **LFO PULSE** to the **LFO RESET** to transform the triangle shape into a saw wave.



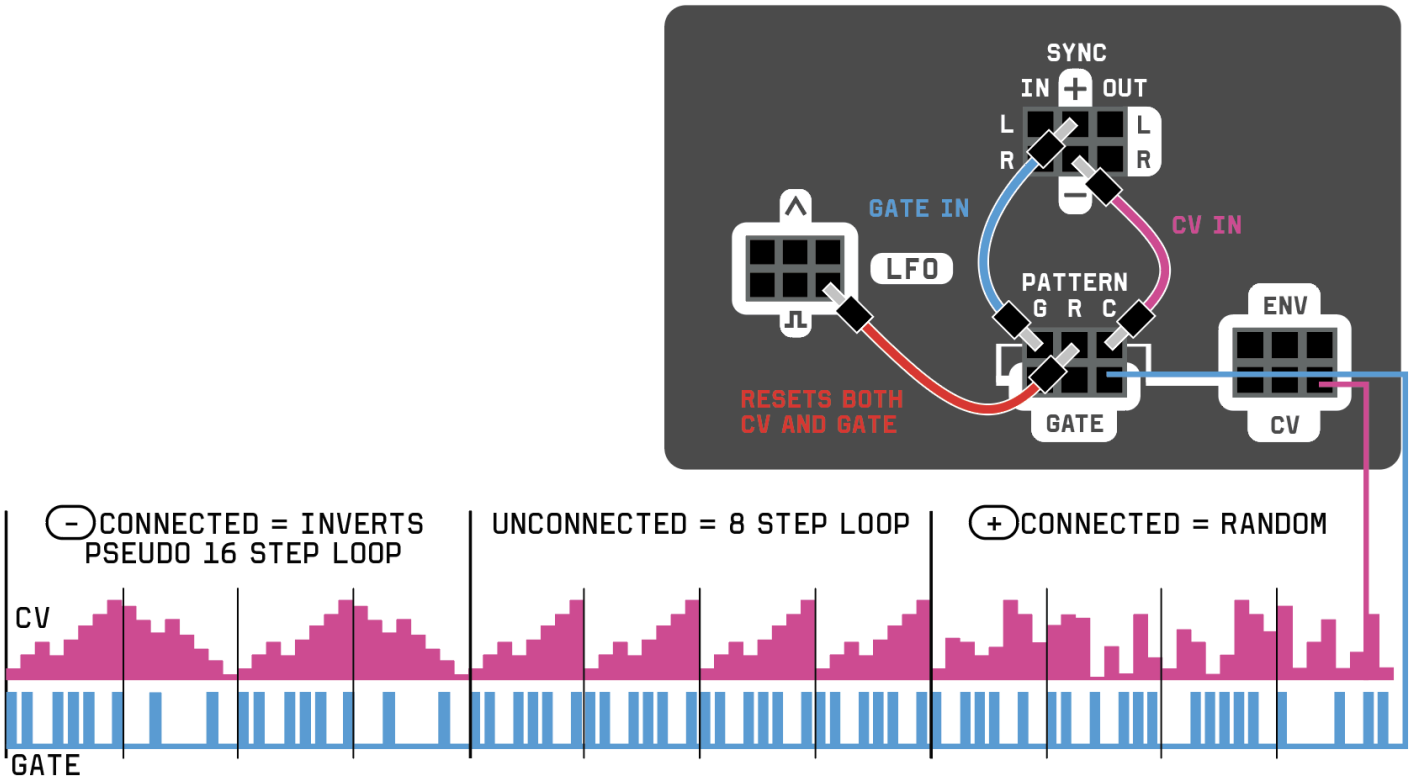
- **Hybrid Wave Shape**:
  Patch the **LFO TRI** to the **LFO RESET** to create a hybrid wave from the triangle shape.



Pattern Generator

The **Pattern Generator** produces two signals: **GATE** and **CV**, both of which are always clocked by the tempo and run on a 8-step sequence.

- **GATE**: Provides rhythmic information, with the gate length fixed at 75% of the step duration.
- **CV**: Outputs varying stepped voltages.



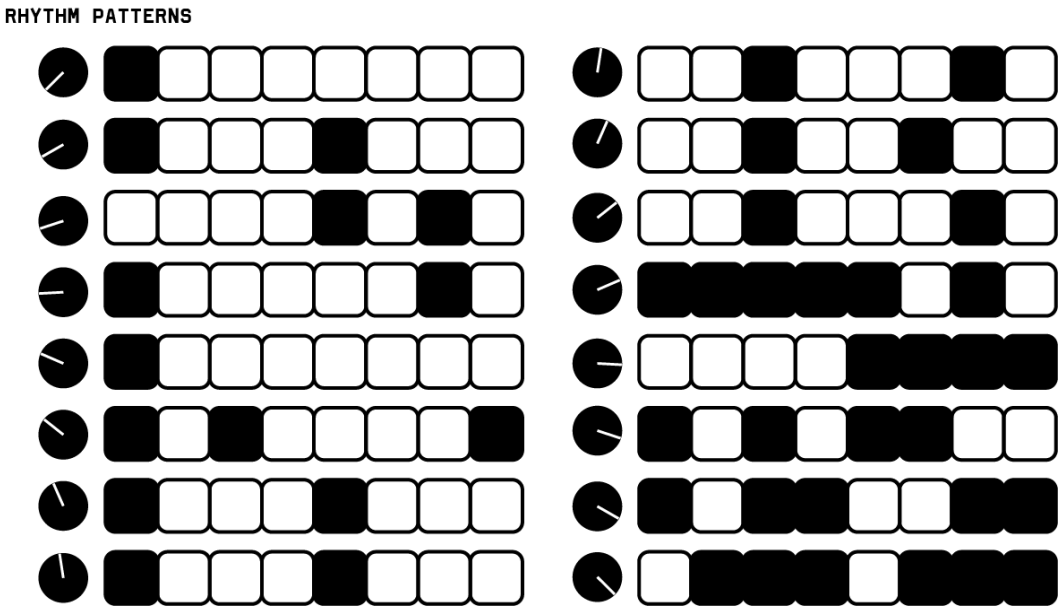
Reset

The **GENERATOR RESET input** (PATTERN R – the middle pin) resets both the **GATE** and **CV sequences** upon detecting a rising edge.

- This can be used for synchronization purposes.
- It can also shorten the pattern sequence, for example, by patching in the **LFO**.

Gate

👆🎛️ Hold **SHIFT** and turn the **LFO MOD** knob to generate the **RHYTHM sequence** at the **GATE output**. The sequence will be selected from a table of 16 different patterns.



The **GATE GENERATOR input** (PATTERN G – the left pin) modifies the **GATE sequence** in the following ways:

- **Unconnected**: The gate sequence remains unchanged.
- **Connected to +**: The current position in the gate sequence is randomized.
- **Connected to -**: The current position in the gate sequence is inverted (inactive steps become active and vice versa).

TIP: Try connecting and disconnecting the + or - output to randomize or invert the steps in the pattern until the sequence fits your needs.

CV

The **CV GENERATOR input** (PATTERN C – the right pin) modifies the **CV sequence** in the following ways:

- **Unconnected**: The CV sequence remains unchanged.
- **Connected to +**: The current level of the CV sequence is randomized.
- **Connected to -**: The current level of the CV sequence gets inverted around a center at 2.5V (e.g., 0V becomes 5V, 1V becomes 4V, and 2V becomes 3V, etc.).

TIP: Connect varying voltages to this input to create semi-random and evolving sequences.
Try connecting and disconnecting the + or - output to randomize or invert the steps in the pattern until the sequence fits your needs.

NOTE: If left connected to **-**, the sequence will continuously invert itself, making it appear **16 steps long**.

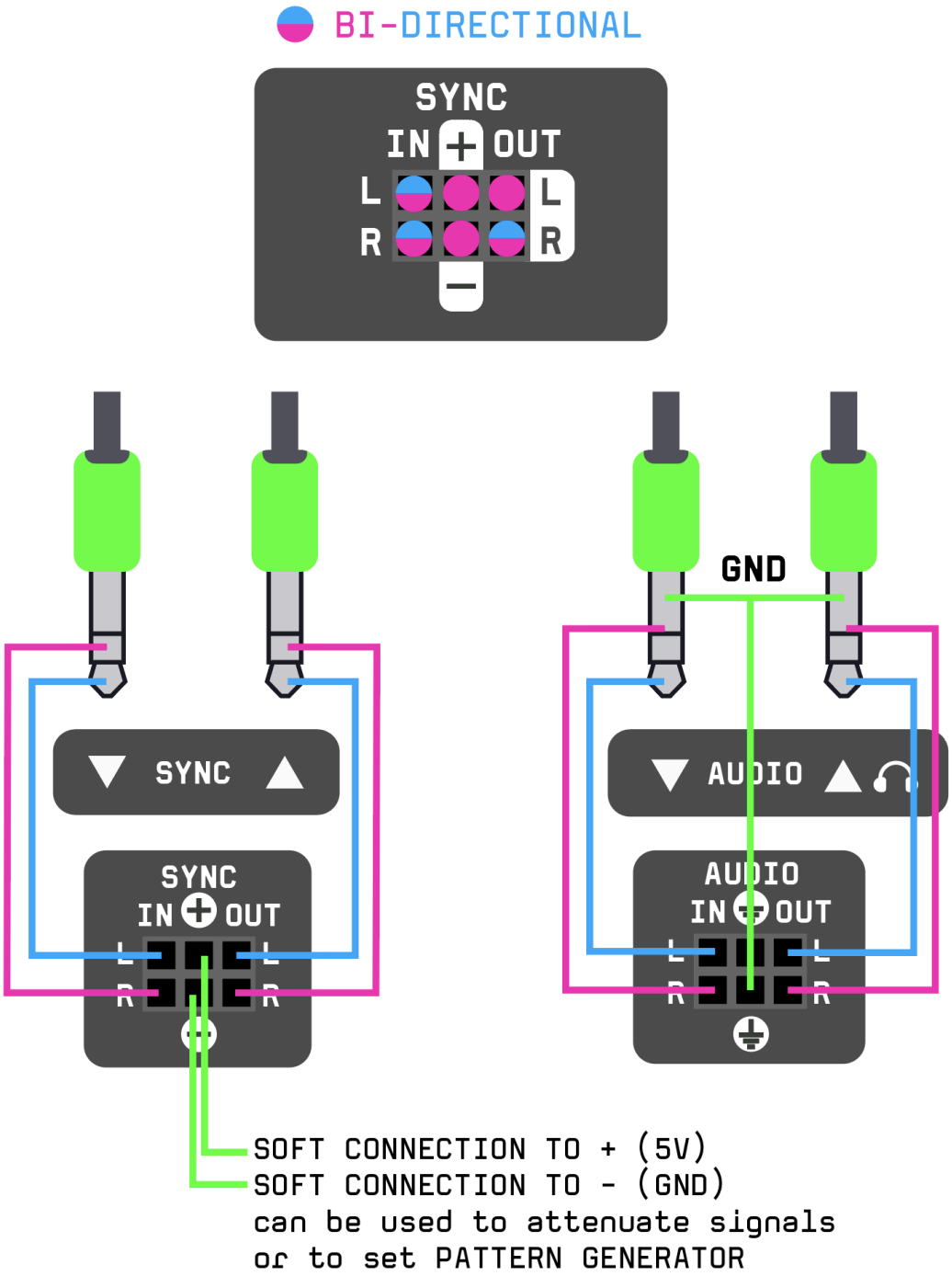
ADVANCED CONNECTIVITY

Modular Connections

The **KASTLE 2** features three **bi-directional ports** that can send signals **In** or **Out** to other instruments.

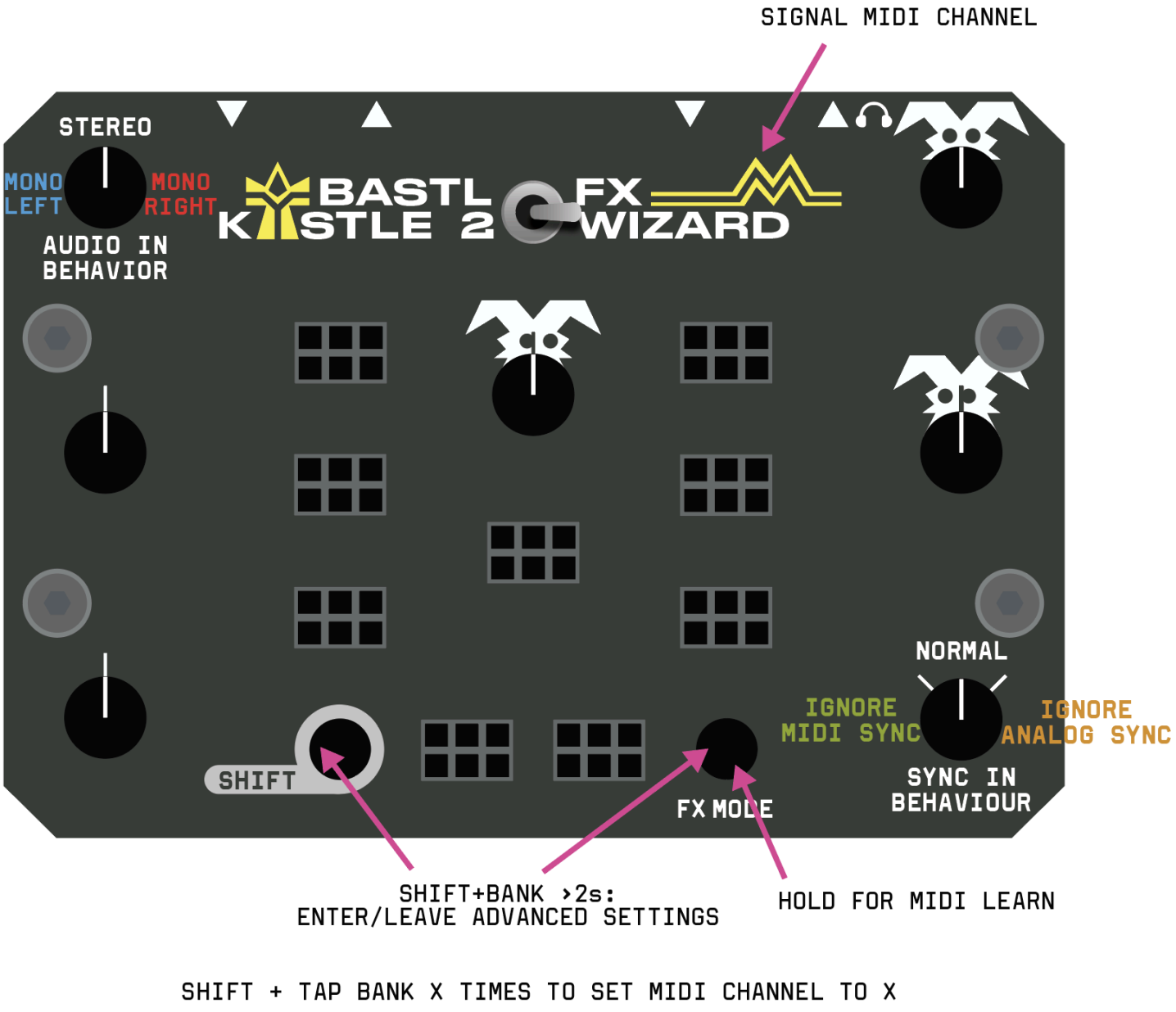
To fully utilize these ports, you may need a **Left and Right splitter adaptor**, as these ports are direct connections to the **TRS jacks**.

NOTE: If you want to use the **SYNC IN** left channel for purposes other than sync/clock signals, you can ignore its default behavior—refer to the Advanced Settings section for more details.



Advanced settings

Hold both the **SHIFT and FX MODE** buttons for **over 2 seconds** to enter the **Advanced Settings mode**. This mode unlocks expanded connectivity options, allowing you to enhance the capabilities of your **KASTLE 2**.



Audio Input Behavior

While in **Advanced Settings mode**, adjust the **TIME MOD knob**, and the **KASTLE logo light** will change colors to indicate the input mode:

- **BLUE**: Mono input (left channel only). Turn the knob **left**.
- **WHITE**: Stereo input. Leave the knob in the **center position**.
- **RED**: Mono input (right channel only). Turn the knob **right**.

Mono Input

Use the **mono input** setting if you are processing a mono signal and want the left channel to be processed by both the left and right channels of the **Kastle FX core**. This can be particularly useful:

- When sending a clock signal on the right channel and audio only on the left channel (or vice versa—hello, TE-PO).
- When your device outputs only a mono signal.

For additional details, refer to the [Syncing with Pocket Operators] guide.

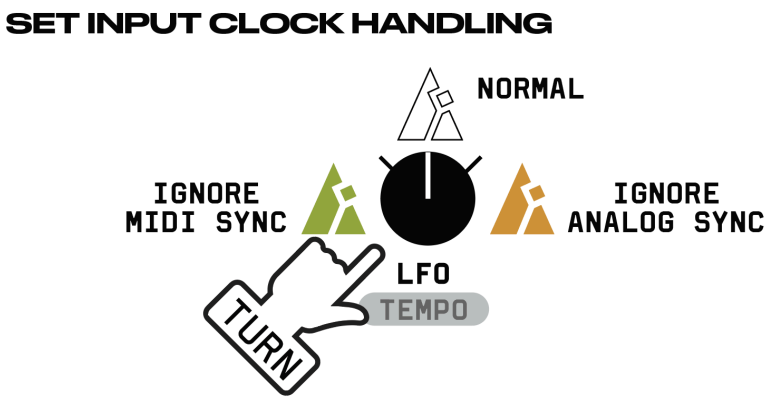
Ignore USB MIDI Clock / Sync Input

You can configure your **FX Wizard** to always use its internal clock and ignore the external clock connected via the **USB MIDI, SYNC IN jack** or **patch input**.

This allows the **SYNC IN jack** to be repurposed for inputting external voltages and routing them to desired destinations.

While in **Advanced Settings mode**, adjust the **LFO knob**, and the **LFO light** will change colors:

- **KHAKI:** Ignore MIDI Clock (turn knob **left**).
- **WHITE:** Normal operation (knob in the **center**) = honors the regular clock priority: MIDI clock, over the SYNC IN, over the internal clock.
- **ORANGE**: Ignore sync input (turn knob **right**).



To exit **Advanced Settings mode**, either:

1. Turn the **Kastle ON/OFF** (settings are automatically saved).
2. Hold **SHIFT** and **FX MODE** for 2 seconds.

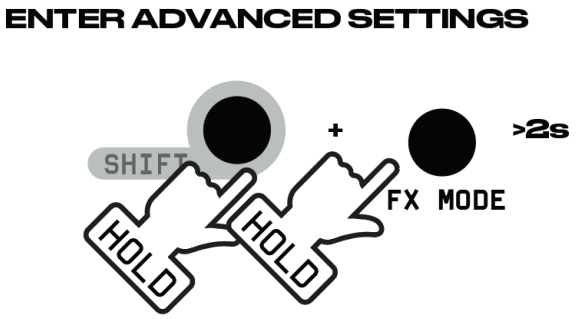
USB MIDI IMPLEMENTATION

Setting the MIDI channel

KASTLE 2 uses the same MIDI channel for both input and output.

NOTE:
The MIDI channel applies to Note, Pitch Bend, and CC (Control Change) messages. As the MIDI Clock messages do not carry channel information, channel settings have no effect on clock transmission or reception.

You can **learn or set the MIDI channel** in the Advanced settings mode. Enter (or leave) the Advanced Settings mode by holding **SHIFT and FX MODE** for 2 seconds.



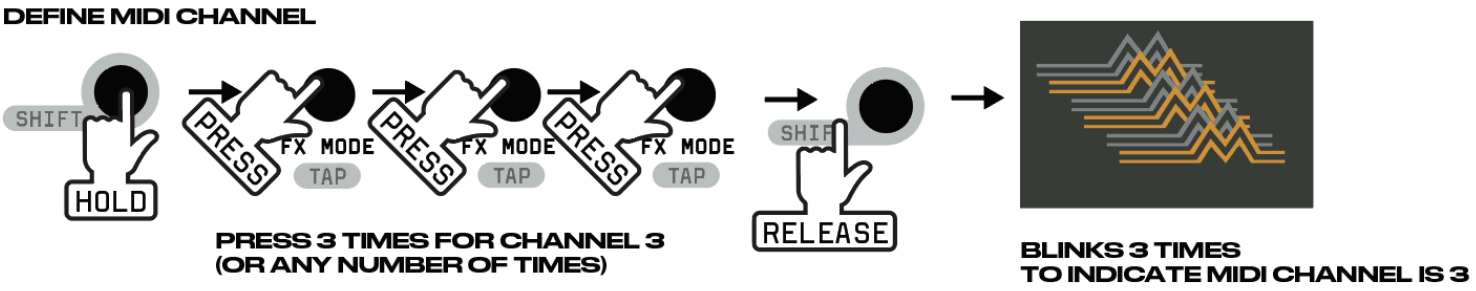
Learn MIDI Channel

To MIDI learn the MIDI input/output channel, hold the FX MODE button for at least 1 second. The top right light will turn off.

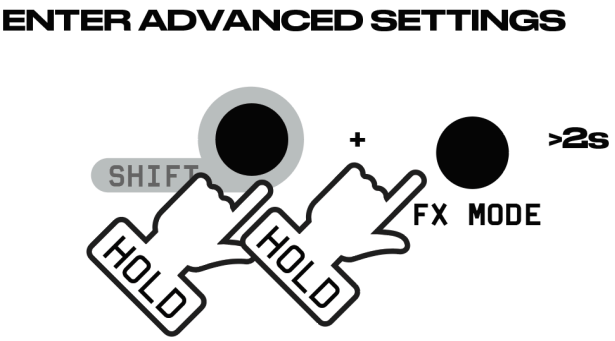
Send any MIDI message (Note, CC, or Pitch Bend). The channel of the received message will be assigned as the new MIDI input/output channel. The top right light will turn orange to confirm the assignment.

Release the FX MODE button. The top right light will blink to indicate the selected MIDI channel number (e.g., 3 blinks = channel 3).
NOTE: If FX MODE and SHIFT buttons are held simultaneously, the MIDI Learn function will NOT be activated.

Set MIDI channel directly



Hold the SHIFT and press the FX MODE button a number of times to set the MIDI channel number manually. The number of presses will be counted once the SHIFT button is released and the top right led will blink the number of times to indicate the MIDI channel number.

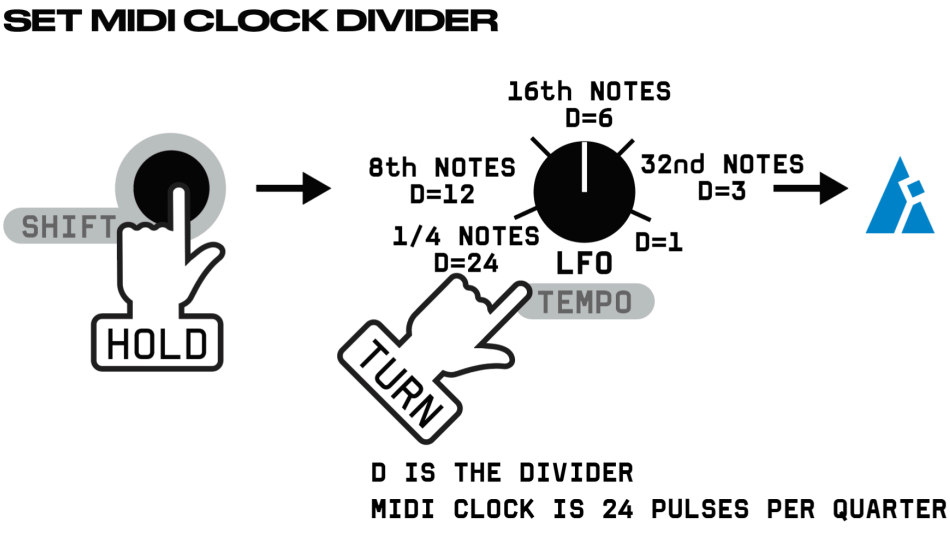


Receiving MIDI Sync (Real Time Messages)

KASTLE 2 automatically syncs to the MIDI clock. If it is present on the USB, it will take the highest priority over the internal and external sync clock.

MIDI Clock

When the MIDI clock is active, TEMPO (SHIFT+LFO) selects the divider of the MIDI clock.



The Pattern Generator will render a step each:

- 24 MIDI clocks (¼ note)
- 12 MIDI clocks (8th note)
- 6 MIDI clocks (16th note)
- 3 MIDI clocks (32nd note)
- 1 MIDI clock (1:1)

The Transport Controls behavior:

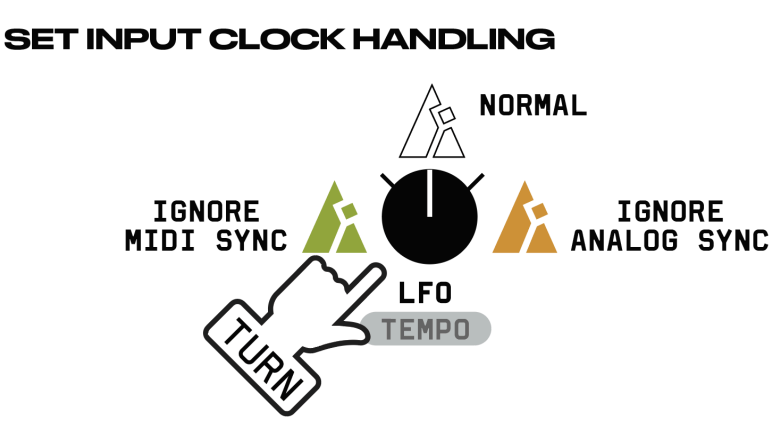
- **MIDI Start** resets the pattern generator to the first step and waits for the MIDI clock to start running. Resets the LFO when LFO is in sync mode.
- **MIDI Stop** resets the pattern generator and stops the sequencer (the MIDI clock may continue running in the background, but the pattern will not run). The MIDI clock is still used to sync the LFO when present even after MIDI Stop.
- **MIDI Continue** starts running the pattern generator from its current position but does not reset it.

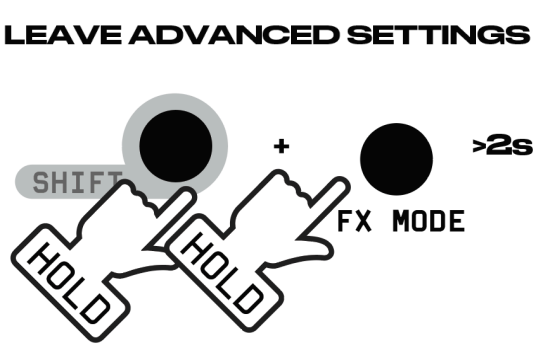
When holding **SHIFT**, the LFO light is **BLUE** to indicate that the MIDI clock sync is active.

You can set **KASTLE 2** to **ignore** the MIDI Clock in the Advanced settings mode. Enter (or leave) the **Advanced Settings mode** by holding **SHIFT and FX MODE** for 2 seconds.

The LFO knob now offers 3 options for clock handling:

- Turn it **LEFT** to ignore the MIDI clock, indicated by **khaki** light.
- In the **CENTER** position, it follows the standard clock priority: MIDI clock over SYNC IN, over internal clock, indicated by **white** light.
- Turn it **RIGHT** to ignore analog SYNC IN, indicated by **orange** light.





Sending MIDI sync (Real Time Messages)

KASTLE 2 sends out MIDI clock and transport controls only if it is NOT receiving MIDI Clock. If MIDI Clock was received during a session, you'll need to stop sending it and restart the **KASTLE 2**. Alternatively, you can activate the **Ignore MIDI Clock** feature in Advanced settings mode to resume sending MIDI Clock.

When using the **internal clock source**, the MIDI clock is always being sent. Resetting the pattern generator with the PATTERN R input will send both MIDI Stop and MIDI Start messages consecutively.

When **SYNC IN** is used as the clock source, **KASTLE 2** will convert it to MIDI Clock. The conversion rate is based on the clock divider setting (TEMPO knob), and MIDI Clock messages are sent as if the pattern generator were advancing on every 16th note (this translates to 6 MIDI Clock ticks per pattern step).

If SYNC IN is inactive for more than 2 seconds (or twice the previous clock interval), the **KASTLE 2** will send a MIDI Stop message and stop sending the MIDI Clock.

Once the external clock resumes, the **KASTLE 2** will send a MIDI Start message and continue sending MIDI Clock.

Receiving MIDI Notes

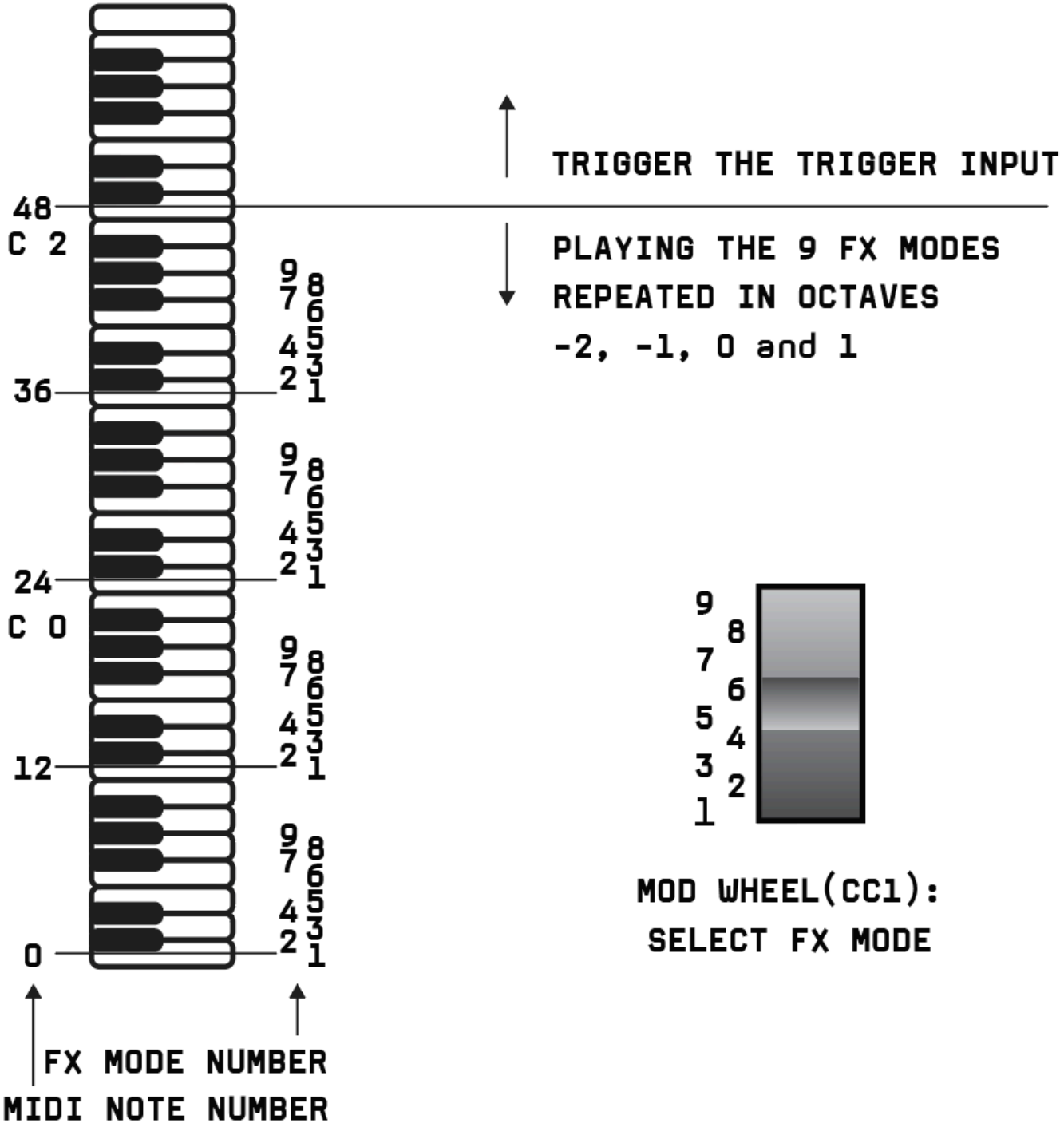
KASTLE 2 reacts to MIDI Note On messages. **Velocity** information is **not utilized**. **Note Off** messages are **ignored**.

MIDI Notes in the lowest 4 octaves 0–8, 12–20, 24–33, 36-44 switch the FX Modes. Note C is always the first mode = Delay.

- MIDI note 0, 12, 24 or 36 (C) – Delay
- MIDI note 1, 13, 25 or 37 (C#) – Flanger
- MIDI note 2, 14, 26 or 38 (D) – Freezer
- MIDI note 3, 15, 27 or 39 (D#) – Panner
- MIDI note 4, 16, 28 or 40 (E) – Crusher

- MIDI note 5, 17, 29 or 41 (F) – Slicer
- MIDI note 6, 18, 30 or 42 (F#) – Pitcher
- MIDI note 7, 19, 31 or 43 (G) – Replayer
- MIDI note 8, 20, 32 or 44 (G#) – Shifter

Notes above note 48 (C2) act as a trigger – no pitch info is used.



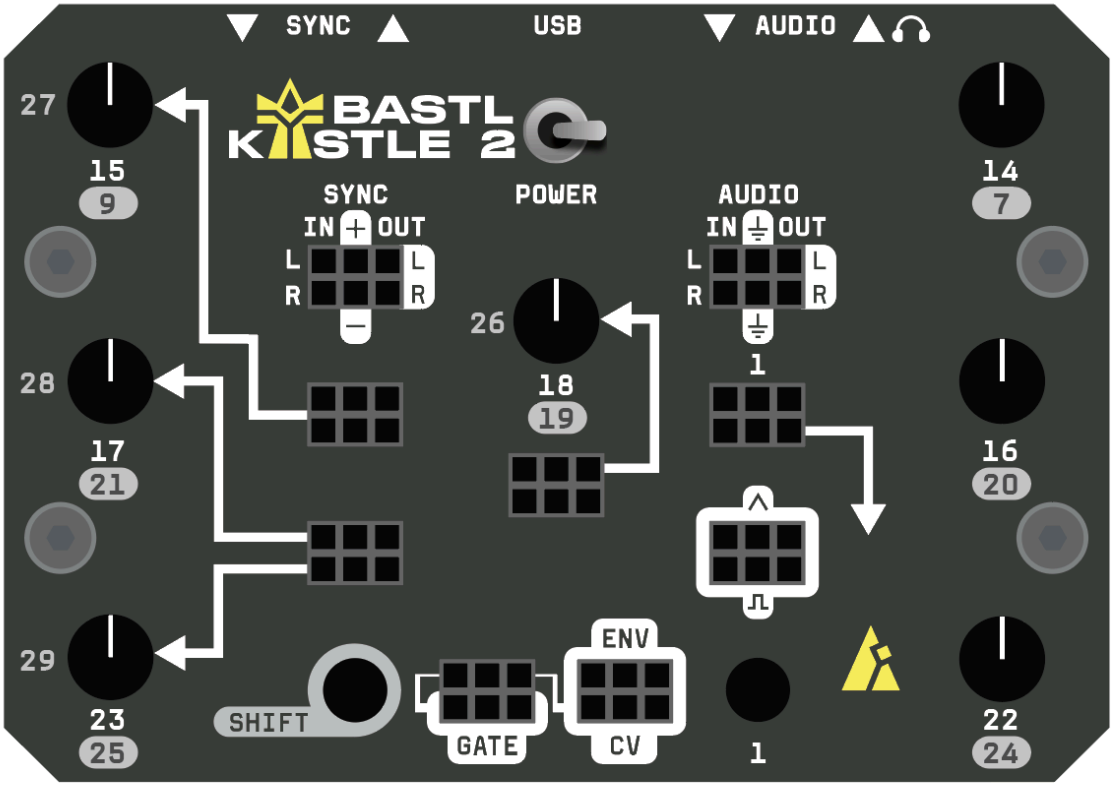
Receiving MIDI CC = Control Change / knob values

Any MIDI CC message contains three key pieces of information:

1. **MIDI Channel** – indicates which channel the message is sent on. (See instructions on setting MIDI channels.)
2. **CC Number** – Acts as the address of which knob or parameter is being controlled (e.g. CC16).
3. **Value** – Represents the position of the knob.

💡When a CC message with the correct number is received, the corresponding knob is virtually adjusted to match the value—and it stays there until the physical knob is moved again.

INPUT CC NUMBERS FOR DIRECT PARAMETER SETTING



CC	FX Wizard	Note
0	-	-
1	FX Mode	Maps 0-127 to 0-number of values
7	Output Volume	SHIFT + top right knob
9	Input Gain	SHIFT + top left knob
14	TIME	top right knob

15	TIME MOD	top left knob
16	FEEDBACK	middle right knob
17	FEEDBACK MOD	middle left knob
18	AMOUNT	center knob
19	AMOUNT MOD	SHIFT + center knob
20	FILTER	SHIFT + middle right knob
21	STEREO	SHIFT + middle left knob
22	LFO	bottom right knob
23	LFO MOD	bottom left knob
24	TEMPO	SHIFT + bottom right knob
25	RHYTHM	SHIFT + bottom left knob
26	FX MODE MOD	FX Mode + center knob
121	Reset all controllers	Goes back to knob control for values

Sending MIDI CC = Control Change

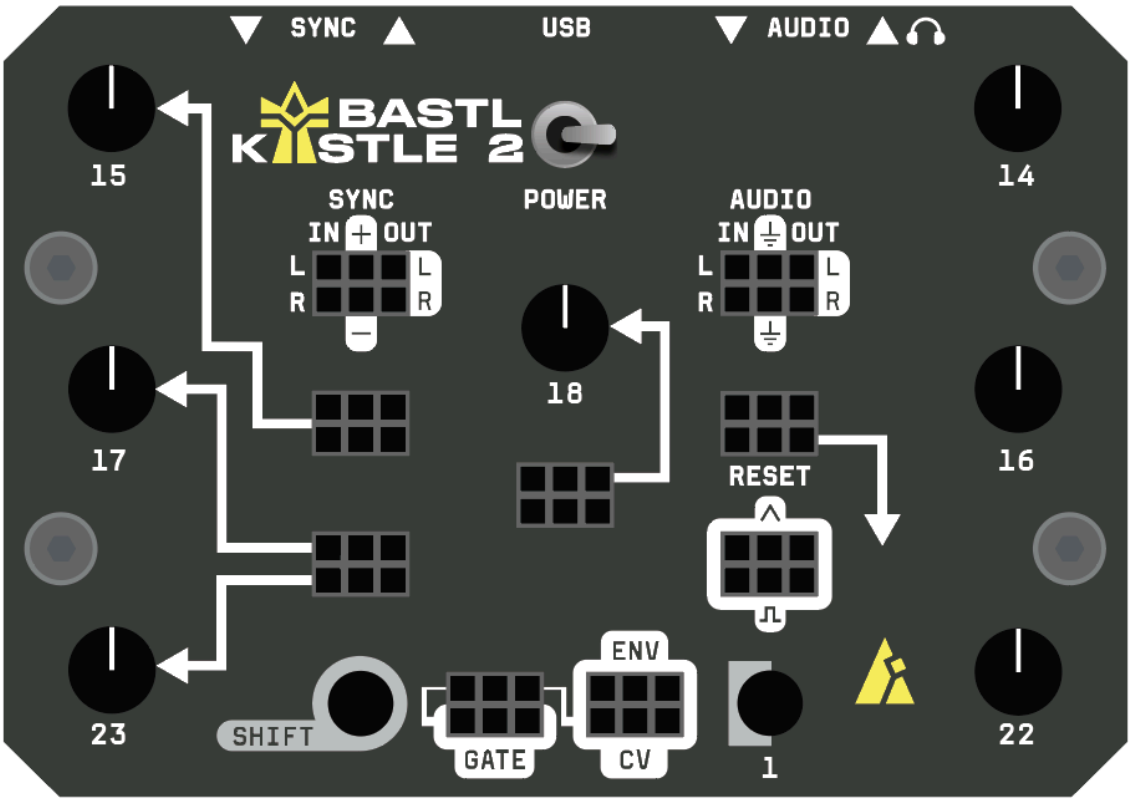
The knobs (when adjusted) send their values scaled to 0-127 on specific CC numbers.
The FX Wizard only acts as a simple knob controller.

CC messages are sent on the same MIDI channel as the incoming MIDI channel. See the **Setting MIDI Channel** section.

Mapping guide:
To map the CCs sent by the knobs undo all patch cables first. After entering MIDI mapping (in your DAW) make sure to move only the desired knob.

CC1 is always sent when triggered. Patch only GATE or LFO to the TRIG input to map CC1.

OUTPUT CC NUMBERS - DIRECT KNOB OUTPUT



CC	FX Wizard	Note
1	FX MODE	mapped to 0 - 127
14	TIME knob	knob value (sent when knob moved)
15	TIME MOD knob	knob value (sent when knob moved)
16	FEEDBACK knob	knob value (sent when knob moved)
17	FEEDBACK MOD knob	knob value (sent when knob moved)
18	AMOUNT knob	knob value (sent when knob moved)
22	LFO knob	knob value (sent when knob moved)
23	LFO MOD knob	knob value (sent when knob moved)

MEMORY RESET

Press and hold the **SHIFT** and **FX MODE buttons** for over **15 seconds** to perform a memory reset. This will restore all settings to their default values, including tempo, volume settings, input behavior etc.

FIRMWARE UPDATE

1) Use a **USB-C cable** to connect your **KASTLE 2** to your computer.
2) Turn the power switch **off** (to the left).
3) Hold the **SHIFT button** and turn the power switch **on** (to the right).
4) The **KASTLE 2** will boot into **Update Mode** (no sound will play).
5) Copy the **.uf2 file** to the **RPI-RP2 disk** that appears on your computer.

Check Firmware Version

1) **Boot into Test Mode:** Hold **FX MODE** button and turn the power **ON**.
2) **Listen to Audio Output:** The **KASTLE 2** will announce the firmware version via its voice output.

PATCH TIPS

The printable cookbook with patchtips: here

The printable MIDI cheat sheet: here

Blank template for your patches: here

How to sync with Pocket operators guide: here

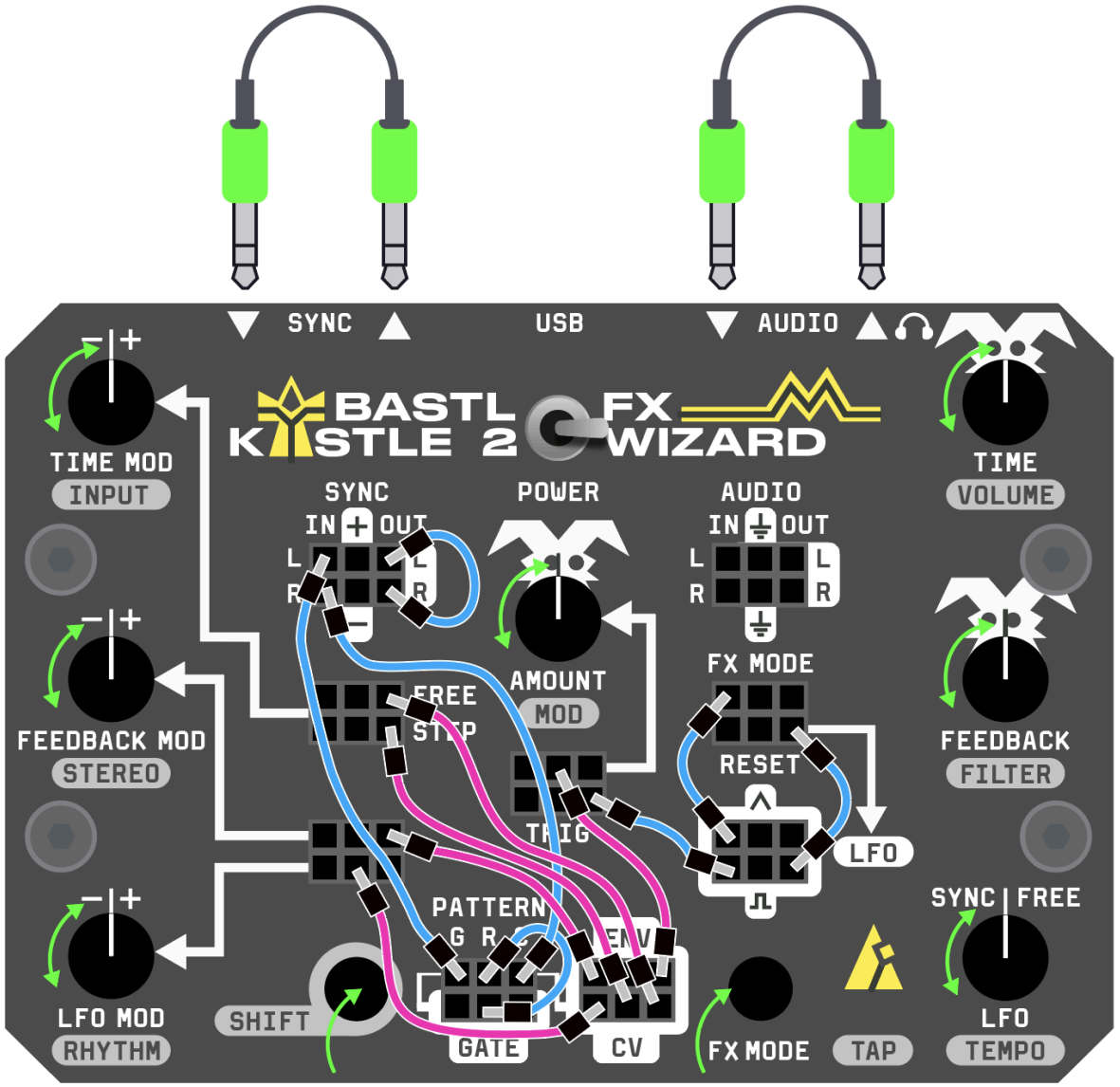
APPENDIX

Test Mode

In order to test the hardware, **KASTLE 2** includes an integrated test mode. Hold **FX MODE** and turn power **ON** to enter the **test mode**. Listen to **Audio Out** and the **KASTLE 2** will announce the firmware version via its voice output.

To perform the full HW test do the following:

1. Turn the power switch off and connect the USB-C cable to the unit (**NOTE:** The test will fail if running only on batteries.)
2. Connect with stereo TRS cables:
    a. SYNC OUT jack to SYNC IN jack
    b. AUDIO OUT jack to AUDIO IN jack
3. Patch the following connections with jumper cables:
    a. LFO PULSE to LFO RESET
    b. LFO PULSE to TRIG
    c. SYNC OUT L to SYNC OUT R
    d. SYNC IN L to PATTERN “G”
    e. SYNC IN R to PATTERN “C”
    f. ENV to FEEDBACK MOD
    g. ENV to AMOUNT MOD
    h. CV to FREE TIME MOD
    i. CV to STEP TIME MOD
    j. CV to LFO MOD
    k. LFO TRI to FX MODE IN
    l. GATE to PATTERN “R”
4. Hold **FX MODE** and turn the power **ON**.
5. **KASTLE 2** will announce the introduction.
6. LEDs will light **red** and automatic testing will start. Each successful test is signalized by a **ding sound**.
7. All automated tests should **pass** and LEDs turn **blue**.
8. Turn all the knobs all the way left and all the way right.
9. Press both buttons.
10. The test should be complete and indicated by green lights, and the **KASTLE 2** announcing “Test Success”.



Kastle 2 FX Wizard user guide version 0.9.2.

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

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