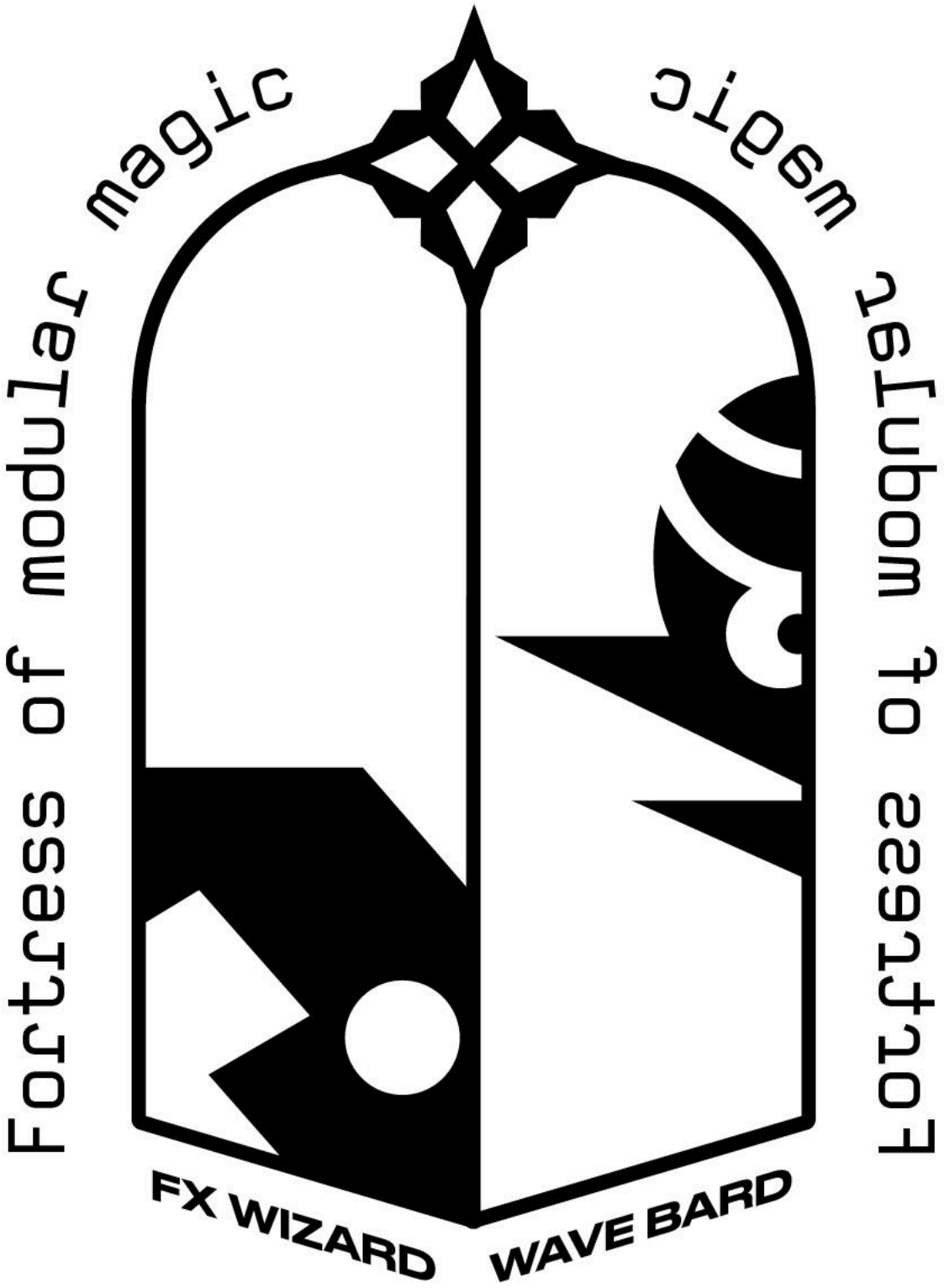
BCITADEL

FX WIZARD

USER MANUAL



CITADEL FX WIZARD

The CITADEL FX WIZARD is a eurorack module 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 receives TRS MIDI and both sends and receives USB MIDI via connector on the back of the module.

The Citadel FX WIZARD is a eurorack module version of the compact Kastle 2, portable instrument. This makes it fit perfectly in the modular synth environment while providing all the necessities for a beginner eurorack setup such as headphone output (line level compatible) and MIDI input/sync, while being complex and fun within larger setups.

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
- 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 eurorack-level DC coupled input with input gain (up to +12db), accepts up to -10V to + 10V
- DC coupled stereo eurorack-level output, -5V to +5V

- stereo headphone output capable of driving headphones up to 250 Ohm
- analog sync input
- analog sync output
- TRS MIDI Input (clock, notes, CCs, pitch bend)
- USB-C on the back of the module (firmware updates, USB MIDI in/out, uploading samples)

TECHNICAL DETAILS

- 16 HP
- PTC fuse and diode protected 10 pin power connector
- 24 mm deep
- current consumption: +12 V: <60 mA (w/o headphones), <90 mA (w/headphones to max); -12 V: <20 mA
- Input Ranges:
  - FREE IN and NOTE IN: **-0.2V to 7V**
  - CLK IN, RESET IN, C IN, G IN: **0V to 5V**
  - LFO MOD, FX MODE IN, FBK IN, AMOUNT IN, LFO RESET, TRIG IN: **-5V to +5V**
  - L/R IN: **-10V to +10V**
- Output Ranges:
  - CLK OUT, ENV OUT, CV OUT, LFO TRI OUT, LFO PULSE OUT: **0V to +5V**
  - L/R OUT **-5V to +5V**
  - Headphone output: 2Vpp (line level compatible)

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 CITADEL 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.

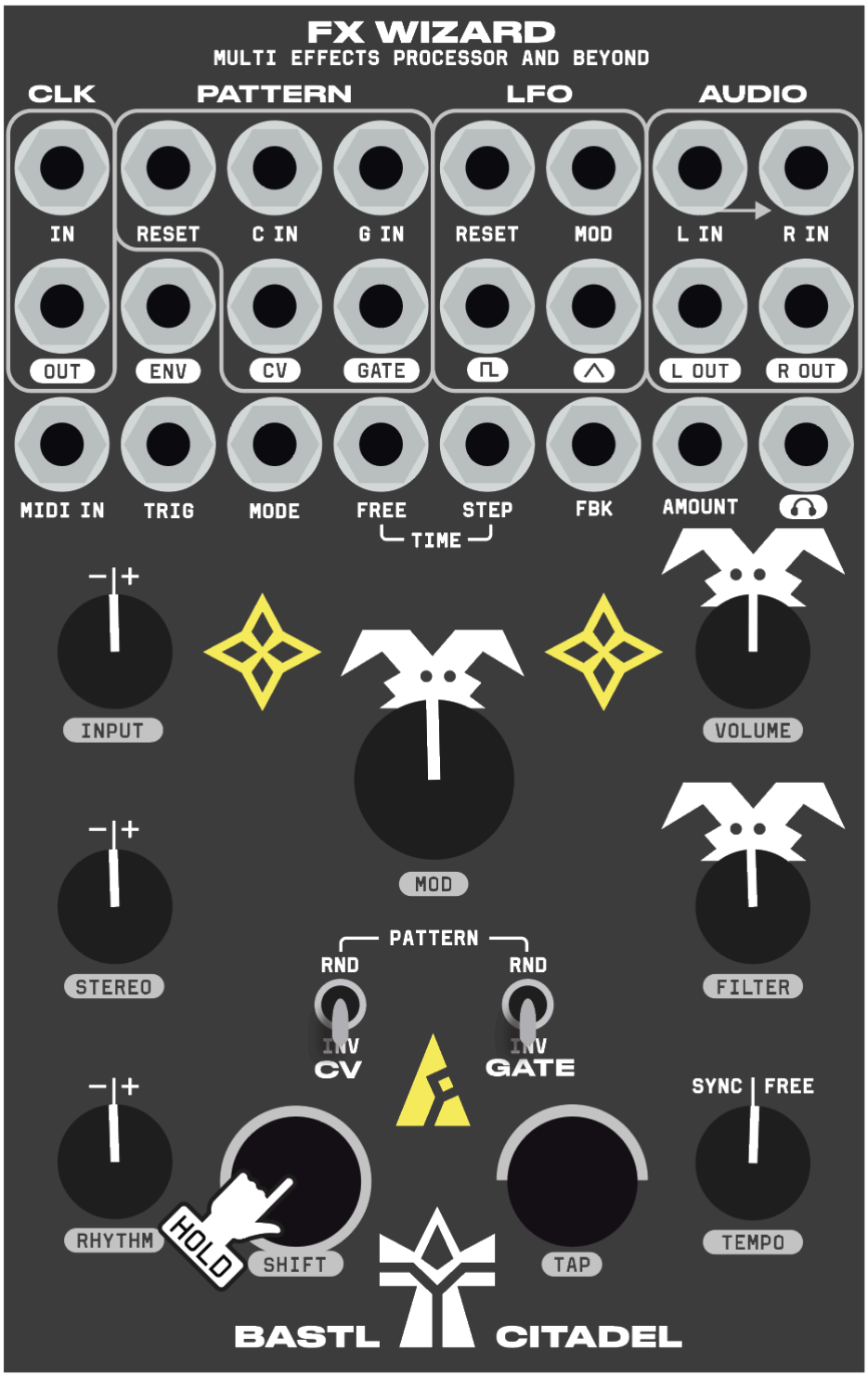
The Quick Start guide is linked here.

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 CITADEL

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

POWER

Before connecting the ribbon cable to this module, disconnect your system from power! Double-check the polarity of the ribbon cable and that it is not misaligned in any direction.
The red wire should match the -12V rail both on the module and the bus board.

! please make sure of the following:

- you have a standard pinout eurorack bus board
- you have +12V and -12V rails on your bus board
- the power rails are not overloaded by current

Although there are protection circuits on this device, we do not accept any responsibility for damages caused by the wrong power supply connection. After you've connected everything, double-checked it, and closed your system (so no power lines can be touched by hand), turn on your system and test the module.

USB

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

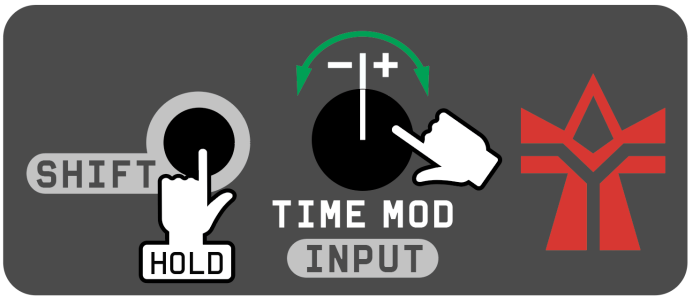
AUDIO

Connect your eurorack level sound source to the **L IN and R IN** jacks. L IN is normalized to R IN so if your source is mono you can plug it to L IN and it will get copied to R IN.

👆🎛️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.



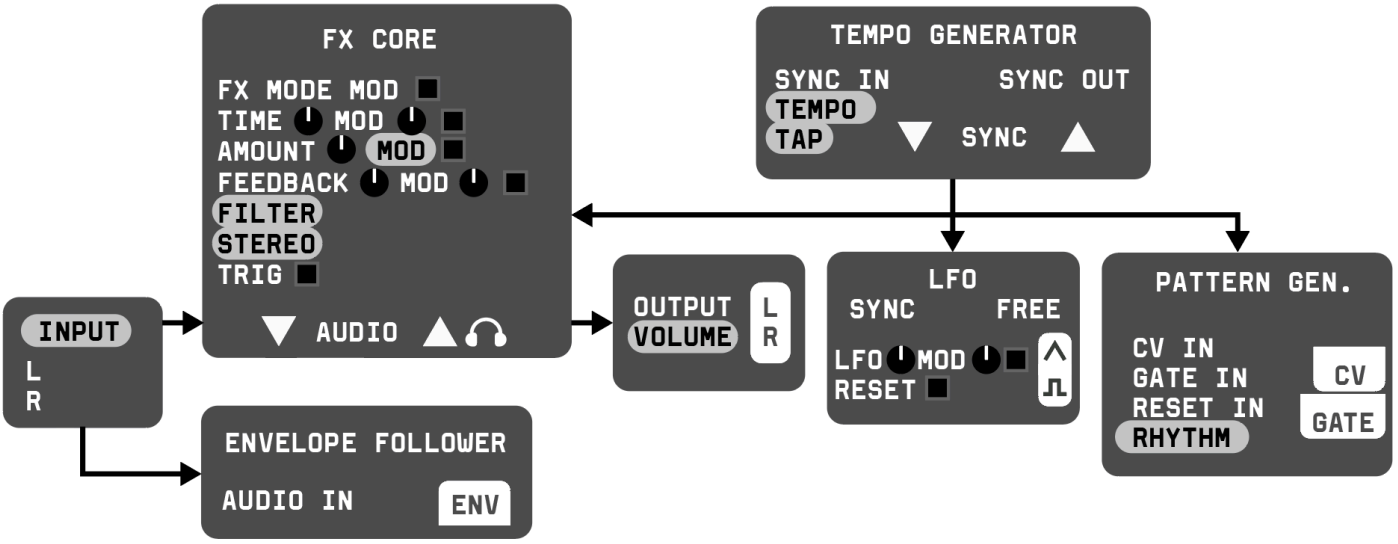
While holding the SHIFT button, the signal strength is indicated by the left light and when it reaches RED, it is clipping at the input, and you should lower your input gain (unless you want to go for that distortion🤘). Keep the input gain so the signal is peaking into orange.

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 and adjust the input gain.

DUNGEON MAP

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

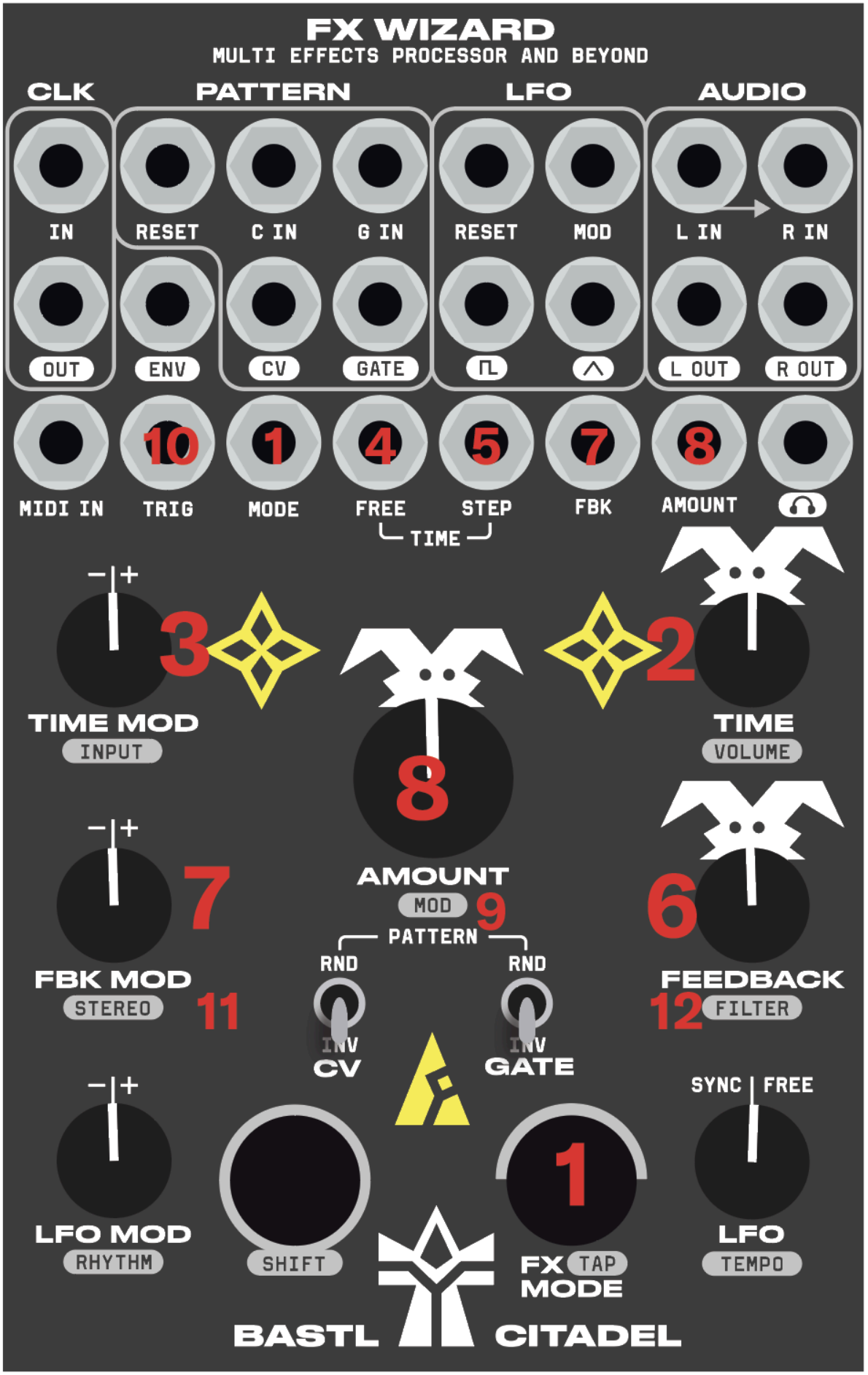


FX CORE

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:



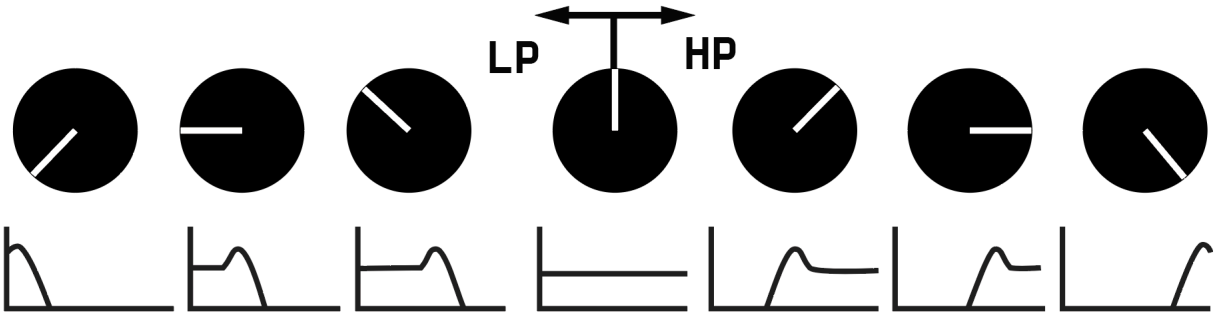
1. **FX MODE** changes the mode/effect and all other parameters change function slightly based on the mode. All the modes are listed below with specific details.
2. **TIME** sets the main time parameter for each effect – often perceived speed or repetition rate or as frequency.
3. **TIME MOD** knob sets 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 (0V to 7V) modulates the TIME parameter real time.
5. The **STEP** TIME MOD patch point (0V to 7V) 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 (-5V to +5V) (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 determines how much effect is applied. Fully left this knob turns off any effect and you should hear a clean signal.
9. **AMOUNT MOD** input (-5V to +5V) 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 (-5V to +5V) 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

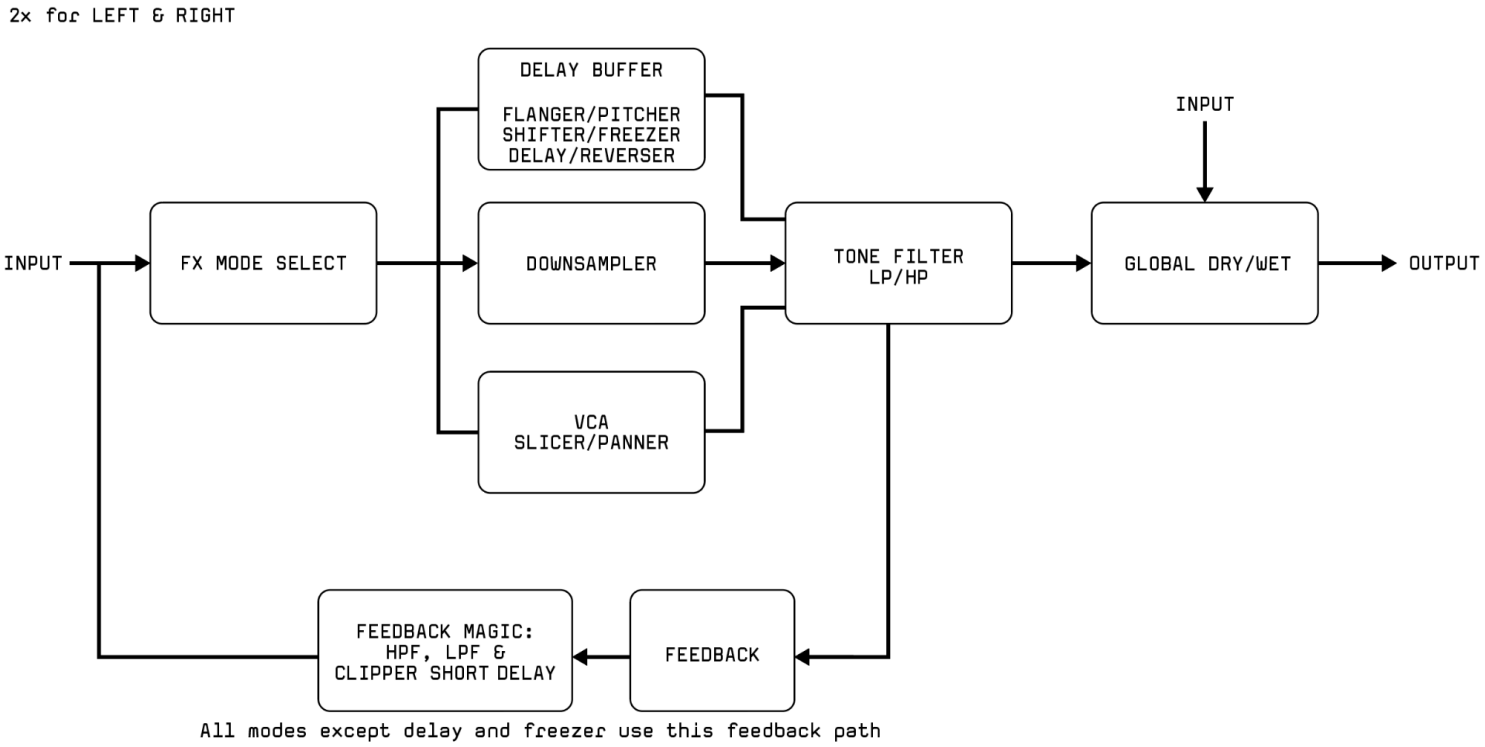
Filter

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 CITADEL FX WIZARD



FX MODEs

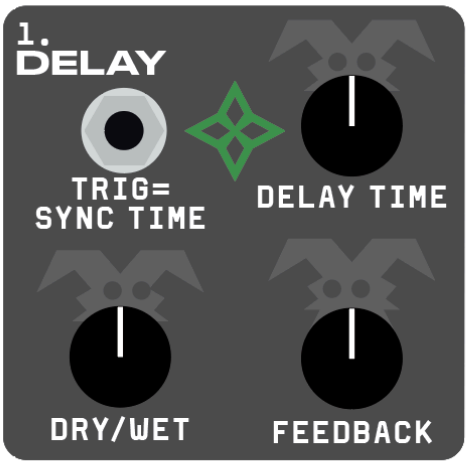
To change the FX MODE to the next one, press the **FX MODE** button. The color on top of CITADEL will change to indicate the selected mode. To go back to the previous FX MODE, **hold** the **FX MODE** button and **press** the **SHIFT** button.

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.

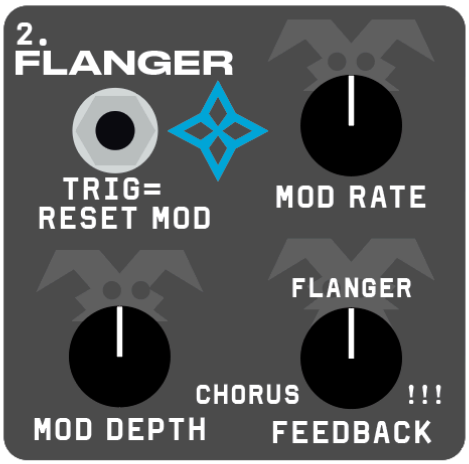
Hold **FX MODE** and turn the **AMOUNT** knob to set attenuation of the FX MODE input.

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

Press FX MODE **= next mode.** **Hold** FX MODE **+ press** SHIFT **= previous mode.**

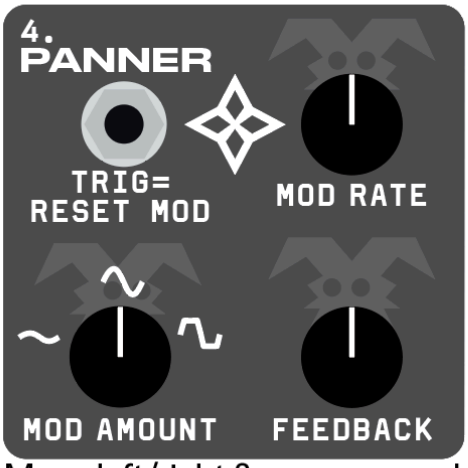


The echo sound full of life.

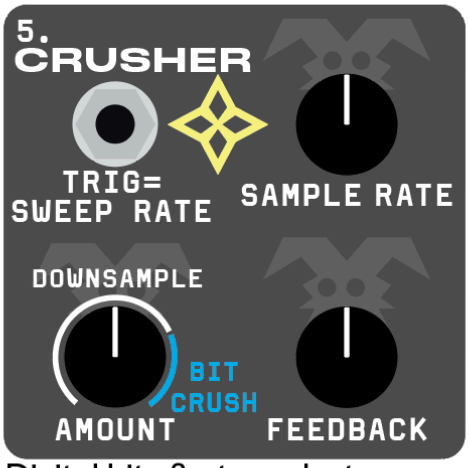


Add movement by detuning.

Freeze bits of incoming sound.



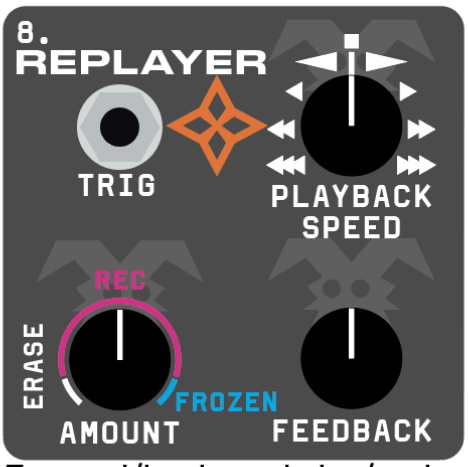
Move left/right & move around.



Digital bits & steps destroyer.

Cut out small transients.

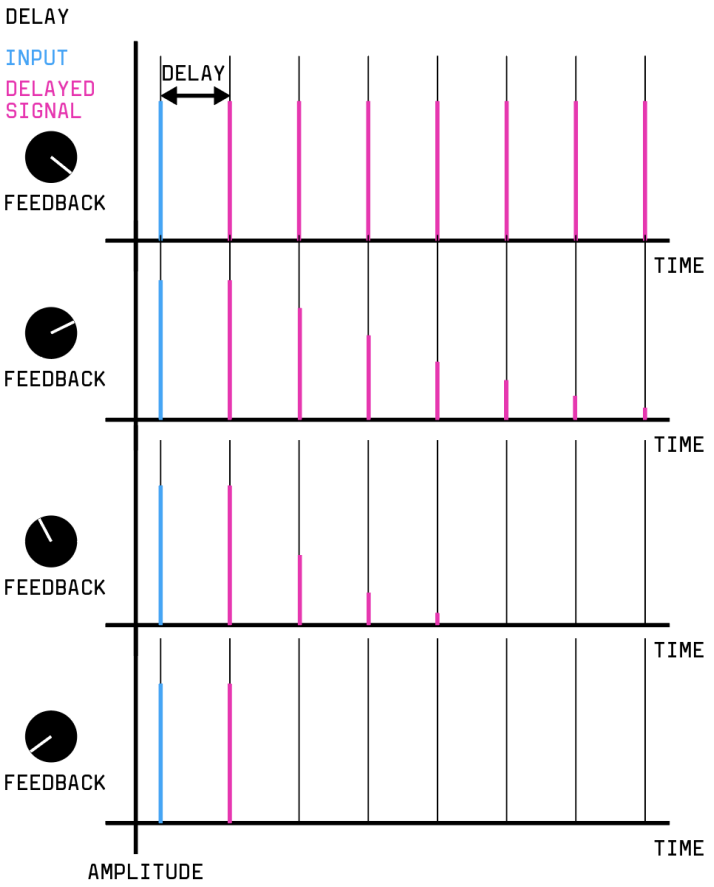
Pitch up & speed up. More!



Forward/backward play/replay.

Shift pitch up or down. A lot!

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.

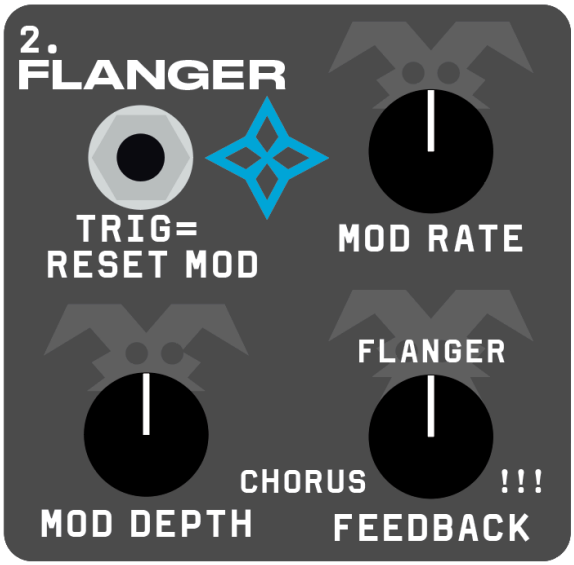
STEREO detunes delay time for left and right channel.

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.

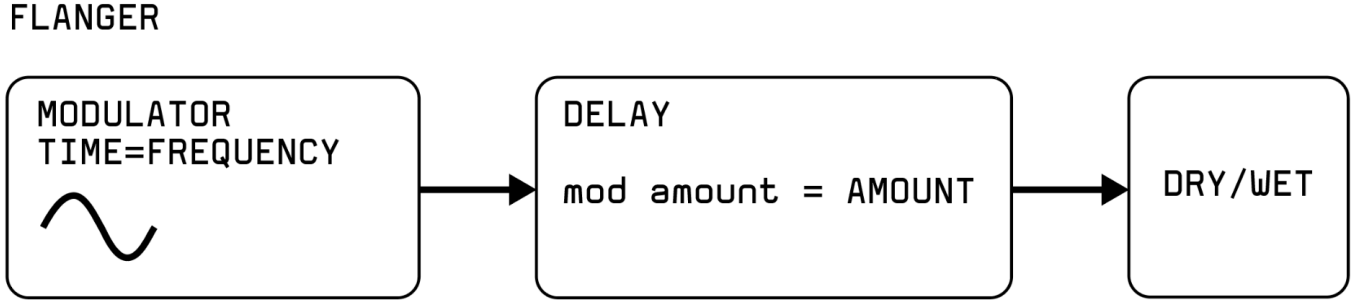
AMOUNT knob sets the amount of ramp modulation of the delay time—increasing the pitch shift and controls local and global dry/wet amounts.

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.

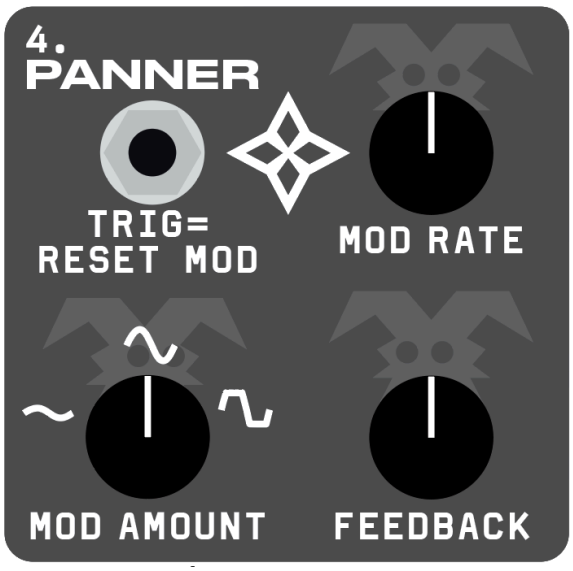
AMOUNT knob controls local and global dry/wet amounts and freezes new audio when leaving the minimum setting.

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.

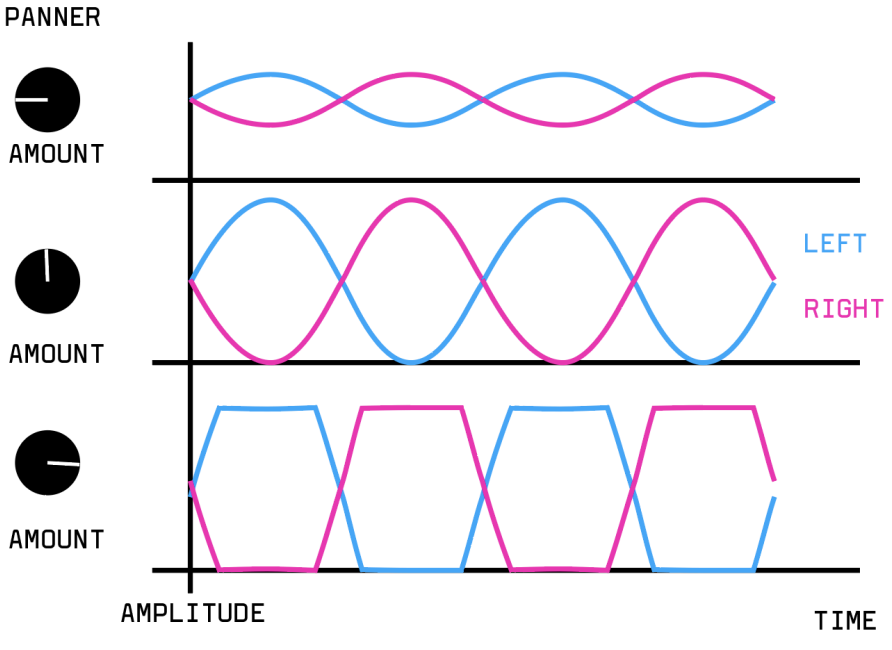
TIME knob sets the panning frequency— goes up to audio rate creating stereo ring mod effect.

AMOUNT knob sets the amount of the amplitude modulation—clipping the sinewave into a squarewave for more radical panning.

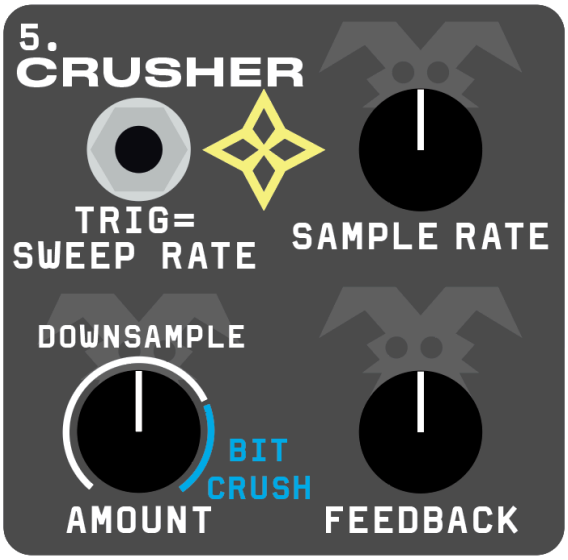
FEEDBACK is the global feedback.

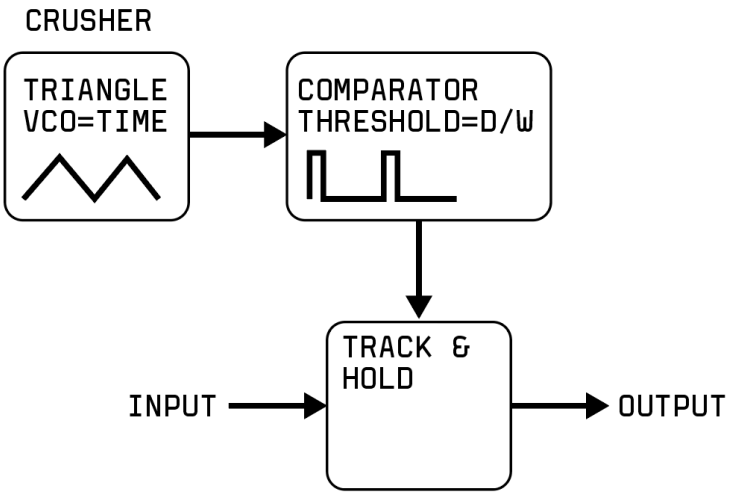
STEREO detunes the left and right channel panning frequency.

TRIG resets panning modulator and switches direction to which side to pan next. You can use this to make triggered panning effects.



CRUSHER (YELLOW)





Introduces downsampling effect and manipulates bits to achieve rich bitcrushing.

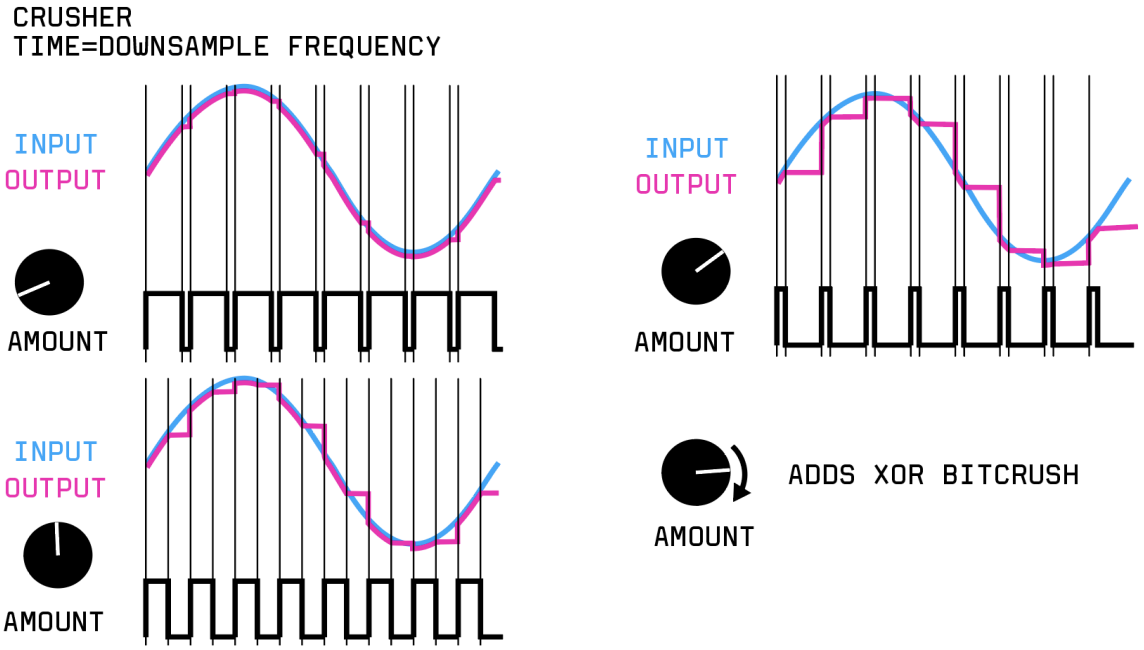
TIME knob sets the downsampling frequency.

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.

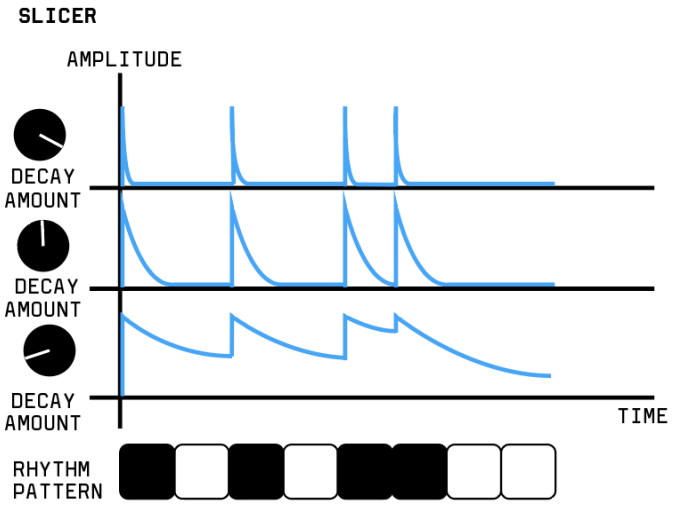
TIME knob sets the trigger pattern for the slicing envelope.

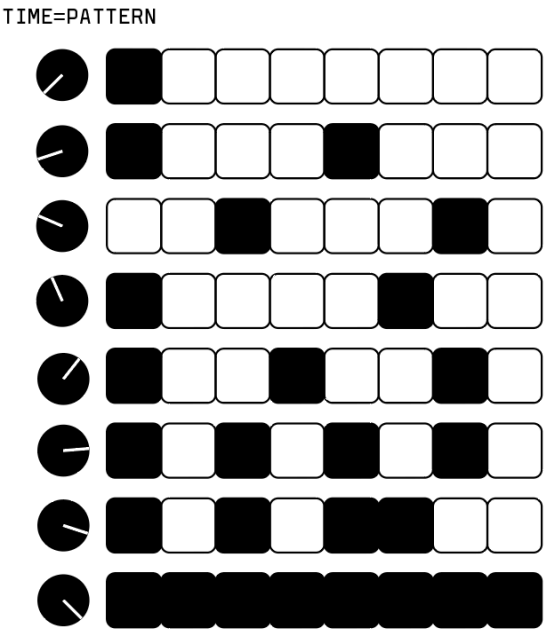
AMOUNT knob sets the DECAY of the envelope (long to the left, short to the right) and controls local and global dry/wet mix.

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.

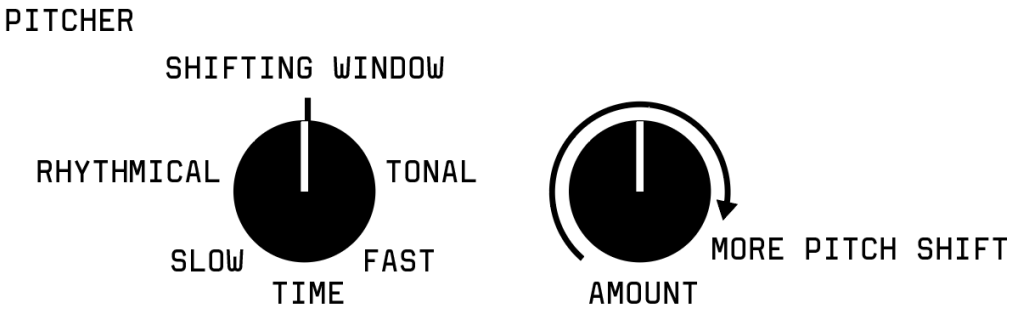
TIME knob sets the size of the shifting window. Can be seen as modulation speed or grain size.

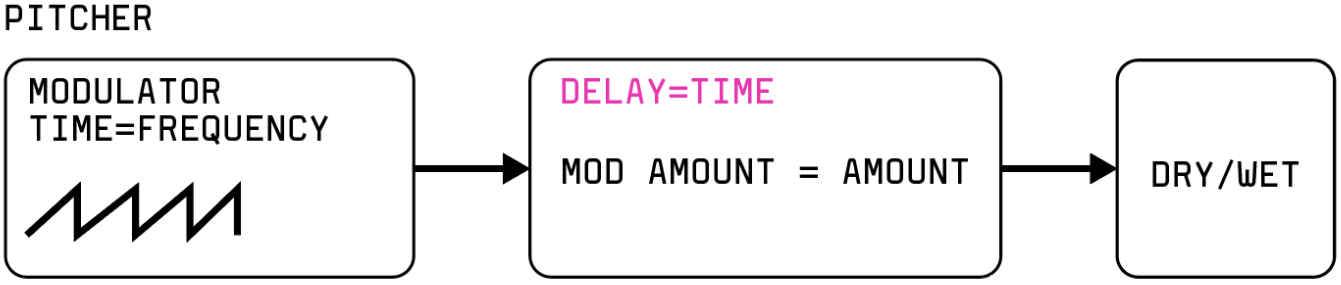
AMOUNT knob sets the amount of ramp modulation of the delay time—increasing the pitch shift and controls the dry/wet mix.

FEEDBACK is the global feedback.

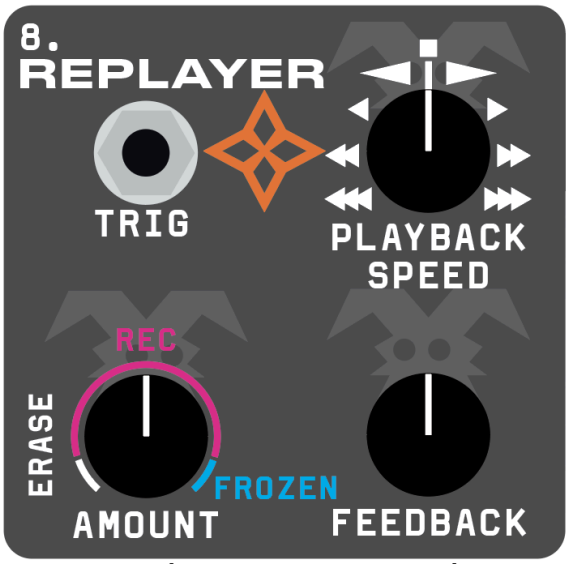
STEREO detunes the modulating frequency for the left and right channel.

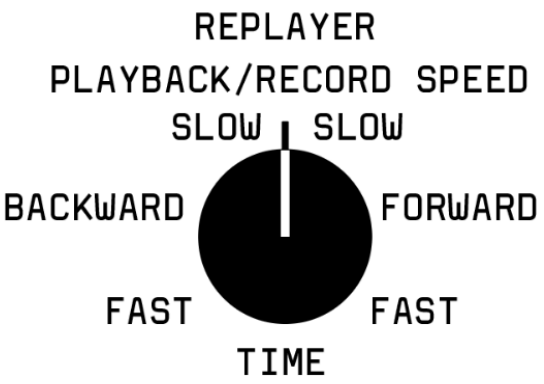
TRIG triggers an envelope that temporarily enlarges the shifting window.





REPLAYER (ORANGE)





Tape looper emulation.

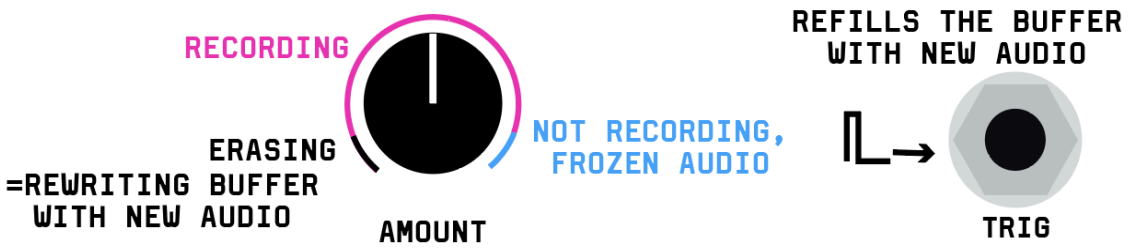
TIME knob sets how fast and in which direction the “tape” runs. To the left, it runs backwards; to the right, it runs forwards. This is for both **recording** and **playback**.

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).

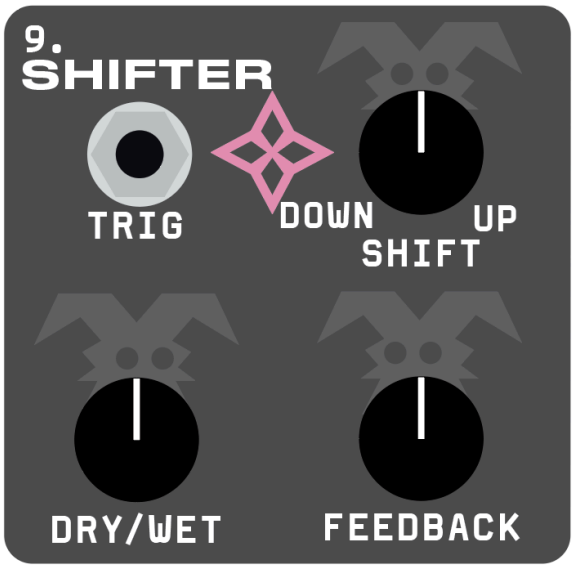
FEEDBACK is the global feedback but only for the incoming new signal, not the output.

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.

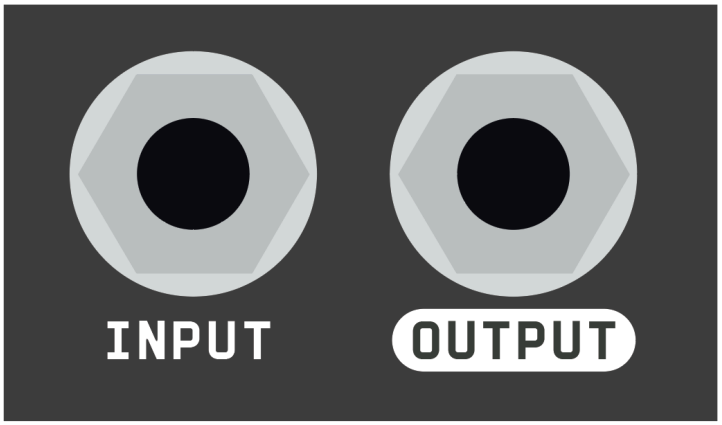
TRIG briefly resets the stereo effect by syncing the controlling LFOs.

PATCHBAY

The **Patchbay** on the **Citadel** consists of many inputs and outputs.

Patchbay Details

- **Outputs**: Marked with a label inside white outline.
- **Inputs**: Labeled with white text without any outline.



Input Ranges

- STEP IN and FREE IN **-0.2V to 7V**
- CLK IN, RESET IN, C IN, G IN **0V to 5V**
- LFO MOD, FX MODE IN, FBK IN, AMOUNT IN, LFO RESET, TRIG IN: **-5V to +5V**
- L/R IN: **-10V to +10V**

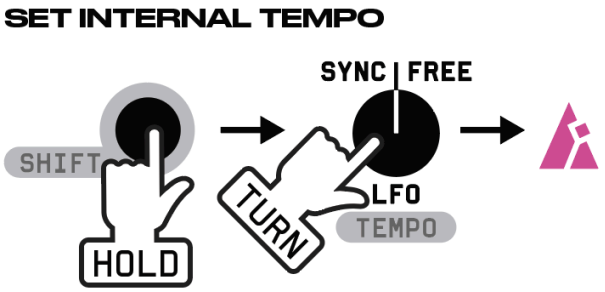
Output Ranges:

- CLK OUT, ENV OUT, CV OUT, LFO TRI OUT,LFO PULSE OUT: **0V to +5V**
- L/R OUT **-5V to +5V**
- Headphone output up to 2Vpp (line level compatible)

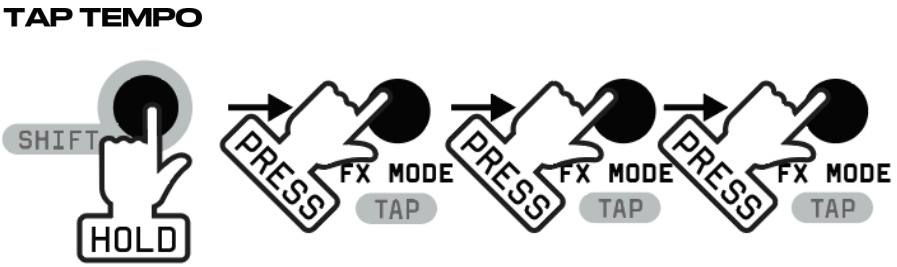
TEMPO GENERATOR

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



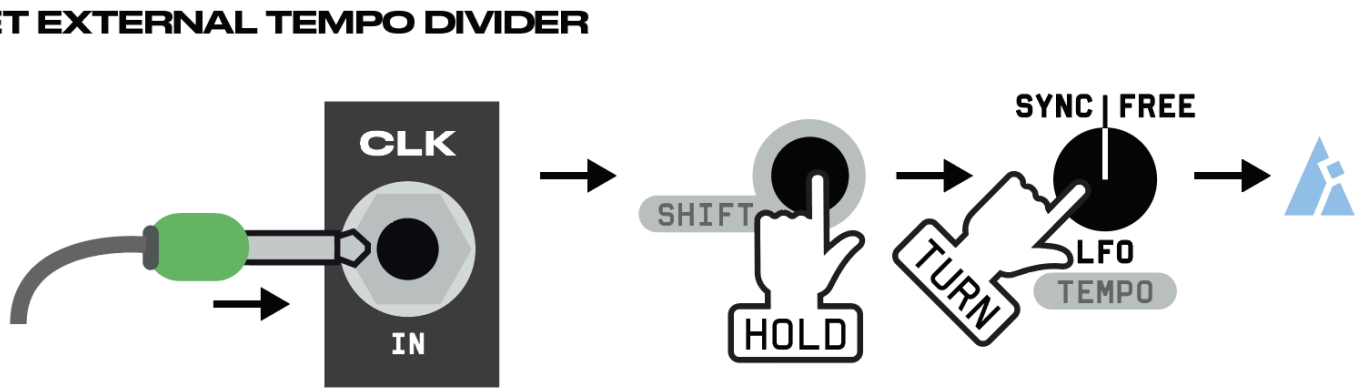
👆🎛️ Hold **SHIFT** and turn the **LFO knob**, indicated by the magenta-colored metronome light.



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

Sync to External Tempo

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



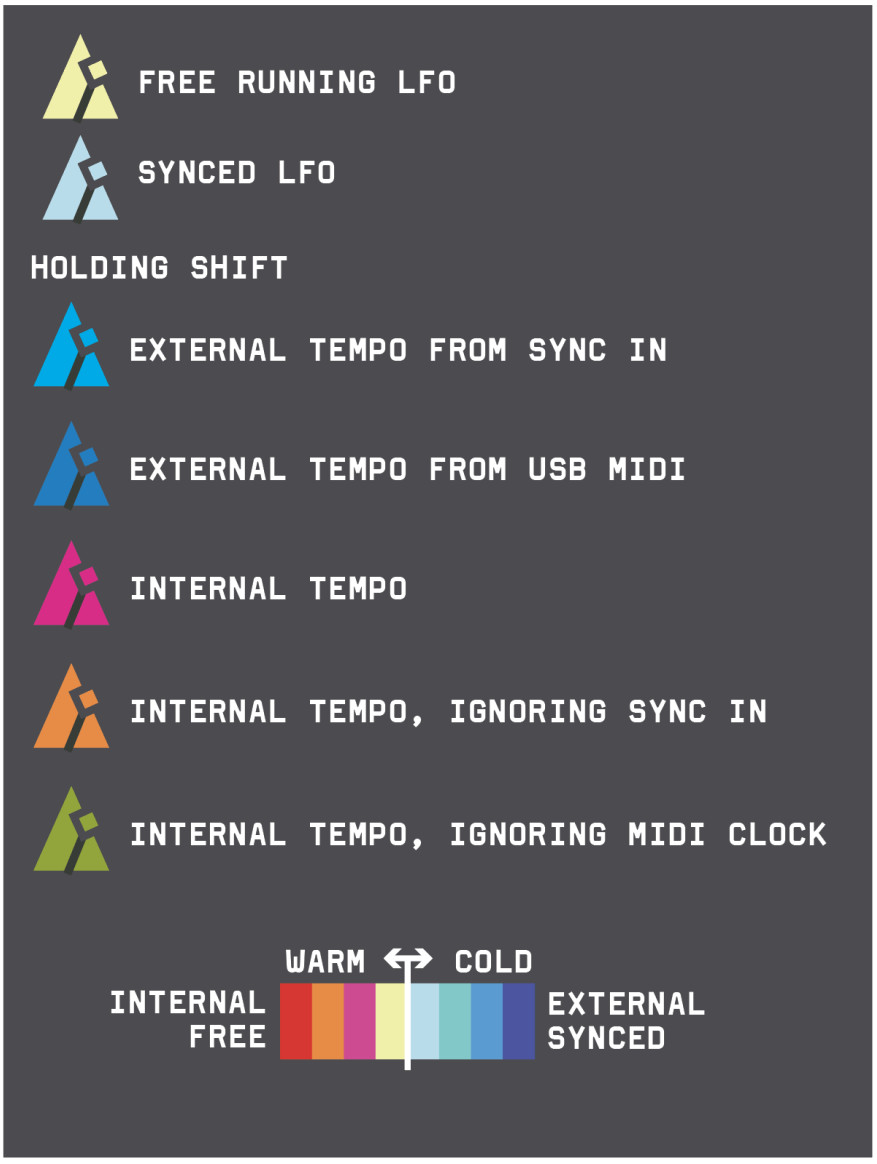
👆🎛️ Hold **SHIFT** and turn the **LFO knob** to select the tempo divider, indicated by the cyan-colored metronome light.

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 **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 **CITADEL** 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 **CITADEL** 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 **CITADEL** 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 **CITADEL** 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 **CITADEL**.

You can set the **TEMPO** on the **CITADEL** 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 **CITADEL**, all downstream devices will remain synchronized with the master clock.

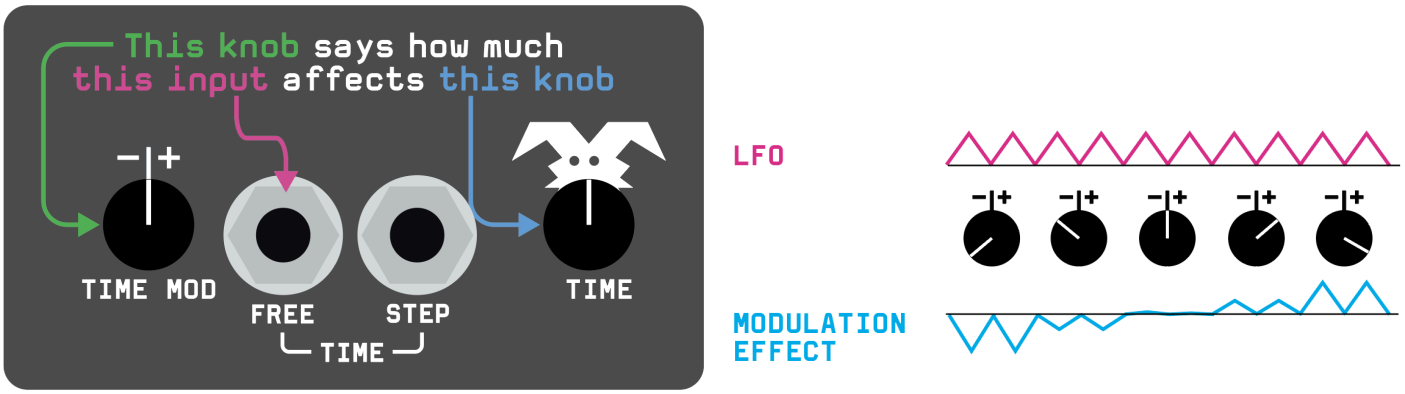
USB MIDI sync

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

MODULATION

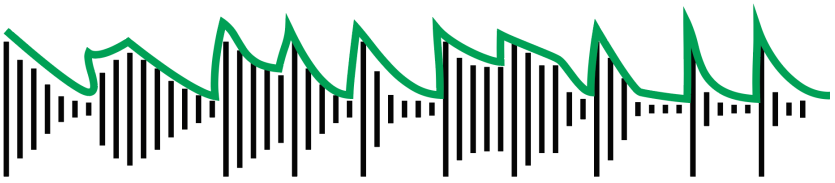
The **CITADEL** features several modulation sources:

- 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 (ENV) (0V to +5V)

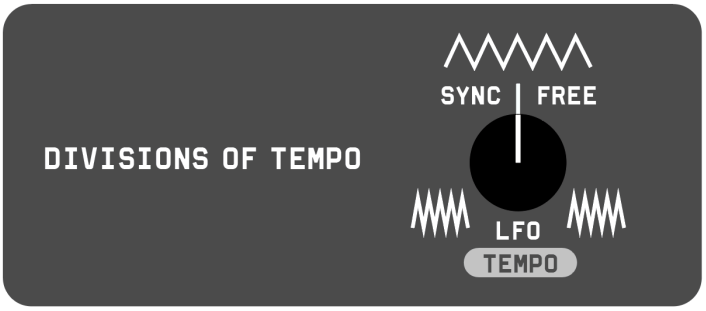
The **ENV** output is an envelope follower representing the loudness of the input signal.



LFO (0V to +5V)

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.

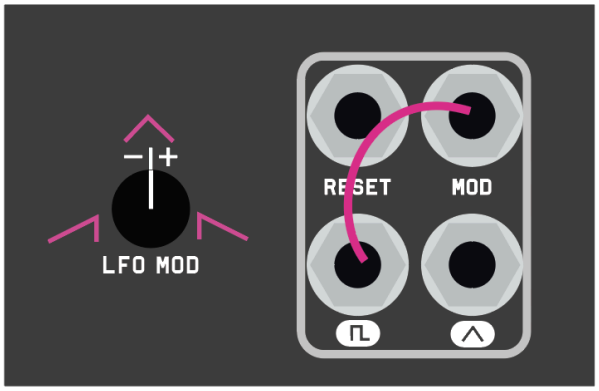
NOTE: Modulation does not switch between synced and free LFO modes but only speeds up or slows down the LFO.

Changing Modulation Shapes

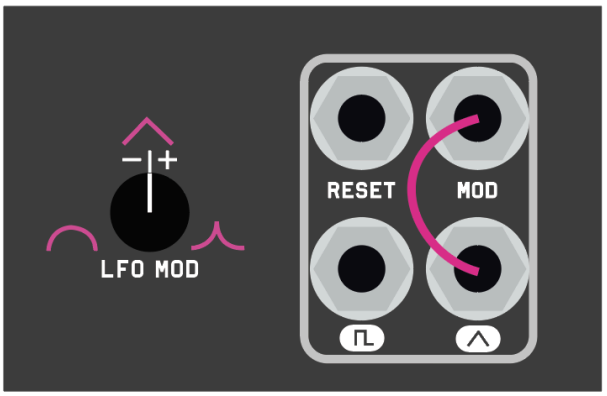
Modulation shapes can be adjusted through **patch programming**.
NOTE: The following methods will also affect the LFO speed.
The **LFO PULSE** output changes its pulse width, remaining high while the triangle rises and low while it falls.

LFO Patch Programming variants

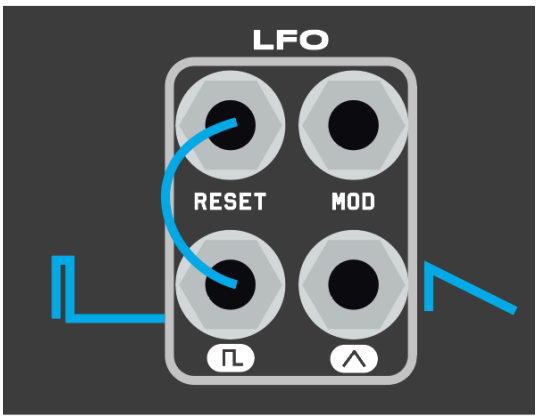
- **Ramp or Saw Shape**:
  Patch the **LFO PULSE** to the **LFO MOD input** and adjust the **LFO MOD** to tilt the triangle into a ramp or saw shape. Adjust the **LFO knob** to fine-tune the result, as turning the **LFO MOD** will affect the LFO frequency.



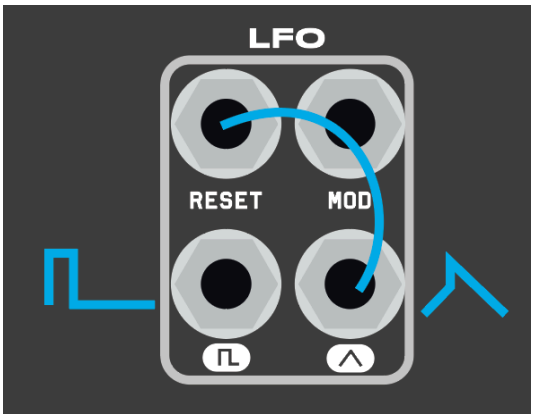
- **Exponential or Logarithmic Shape**:
  Patch the **LFO TRI** to the **LFO MOD input** and adjust the **LFO MOD** to make the triangle shape more exponential or logarithmic.



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



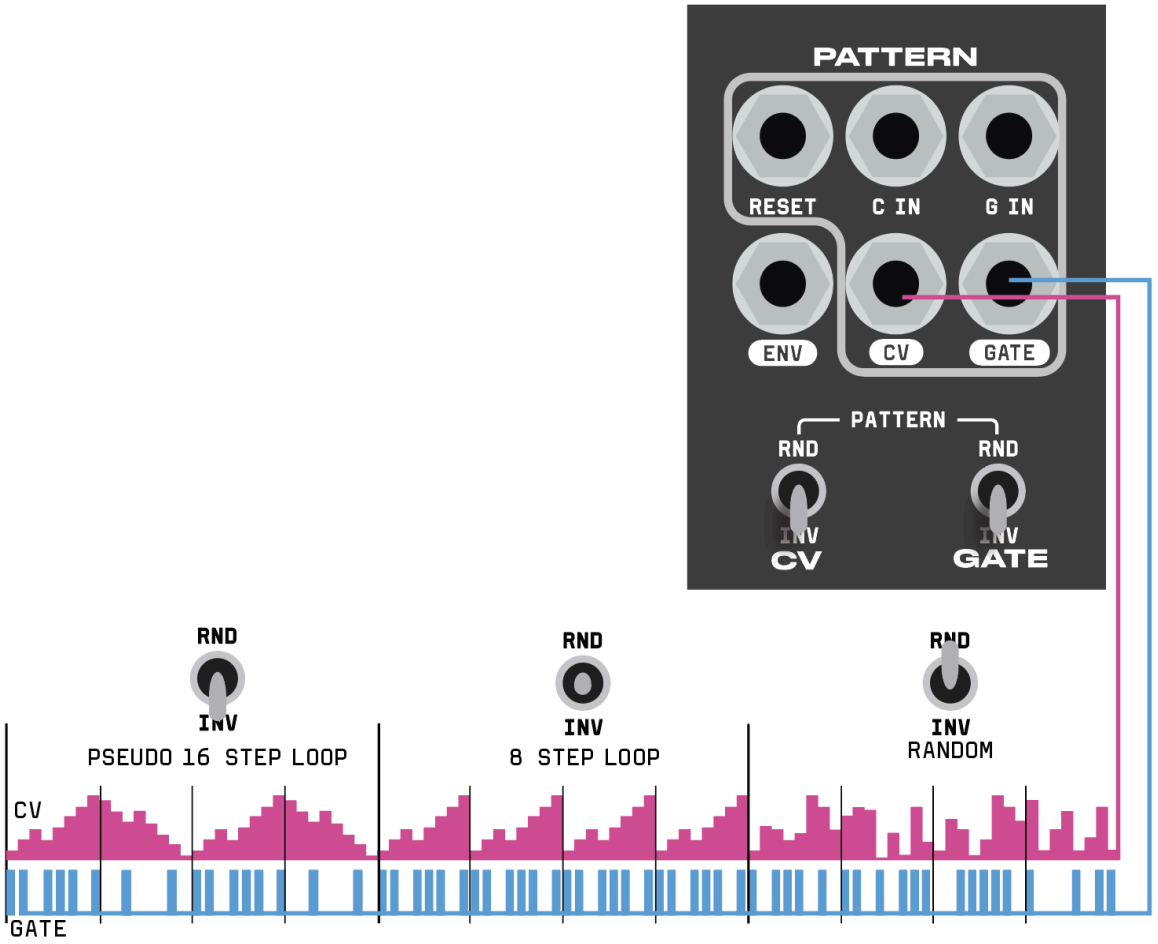
- **Hybrid Wave Shape**:
  Patch the **LFO TRI** to the **LFO RESET** to create a hybrid wave from the triangle shape.

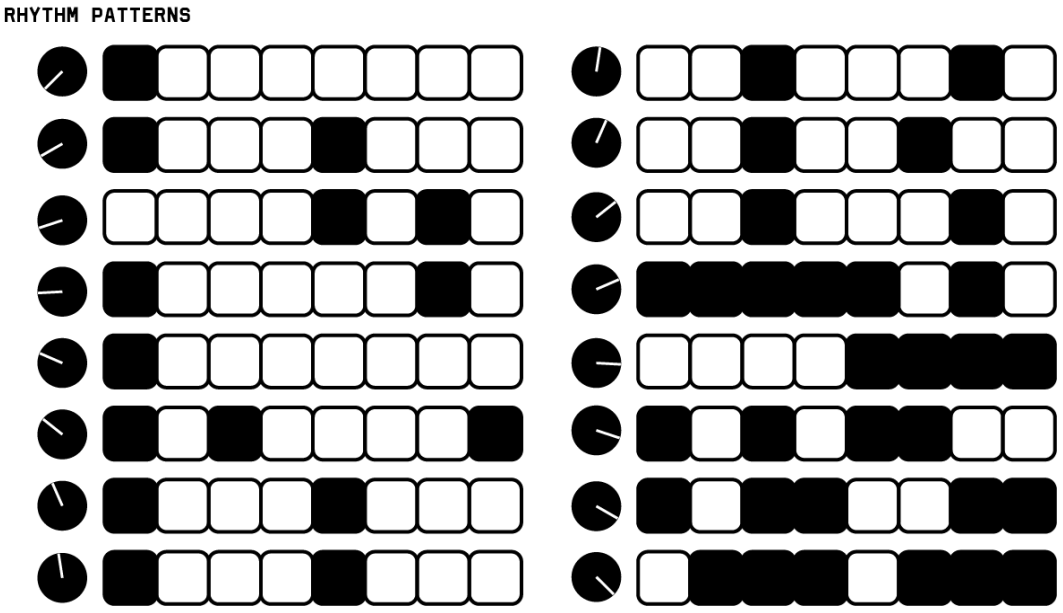


Pattern Generator (0V to +5V)

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.





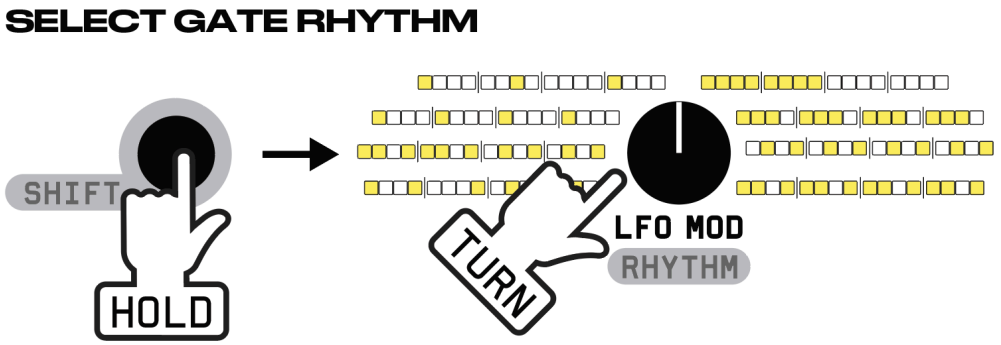
Reset

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 PATTERN SWITCH** is normalized to the GATE GENERATOR input **G IN** and is only active when there is no jack in the G IN. It modifies the **GATE sequence** in the following ways:

- Switch in the **MIDDLE** or G IN voltage in between 1.6 and 3.2V: the gate sequence remains unchanged.
- Switch in the **UP** position or G IN voltage above 3.2V: the current position in the gate sequence is randomized.
- Switch in the **DOWN** position or G IN voltage below 1.6V: the current position in the gate sequence is inverted (inactive steps become active and vice versa).

TIP: Try flipping the switch temporarily to alter the sequence partially.

CV

The **CV PATTERN SWITCH** is normalized to the CV GENERATOR input **C IN** and is only active when there is no jack in the C IN. It modifies the **CV sequence** in the following ways:

- Switch in the **MIDDLE** or C IN voltage in between 1.6 and 3.2V: the CV sequence remains unchanged.
- Switch in the **UP** position or C IN voltage above 3.2V: the current level of the CV sequence is randomized.
- Switch in the **DOWN** position or C IN voltage below 1.6V: the current level of the CV sequence is inverted around a center at 2.5V (e.g., 0V becomes 5V, 1V becomes 4V, and 2V becomes 3V, etc.).

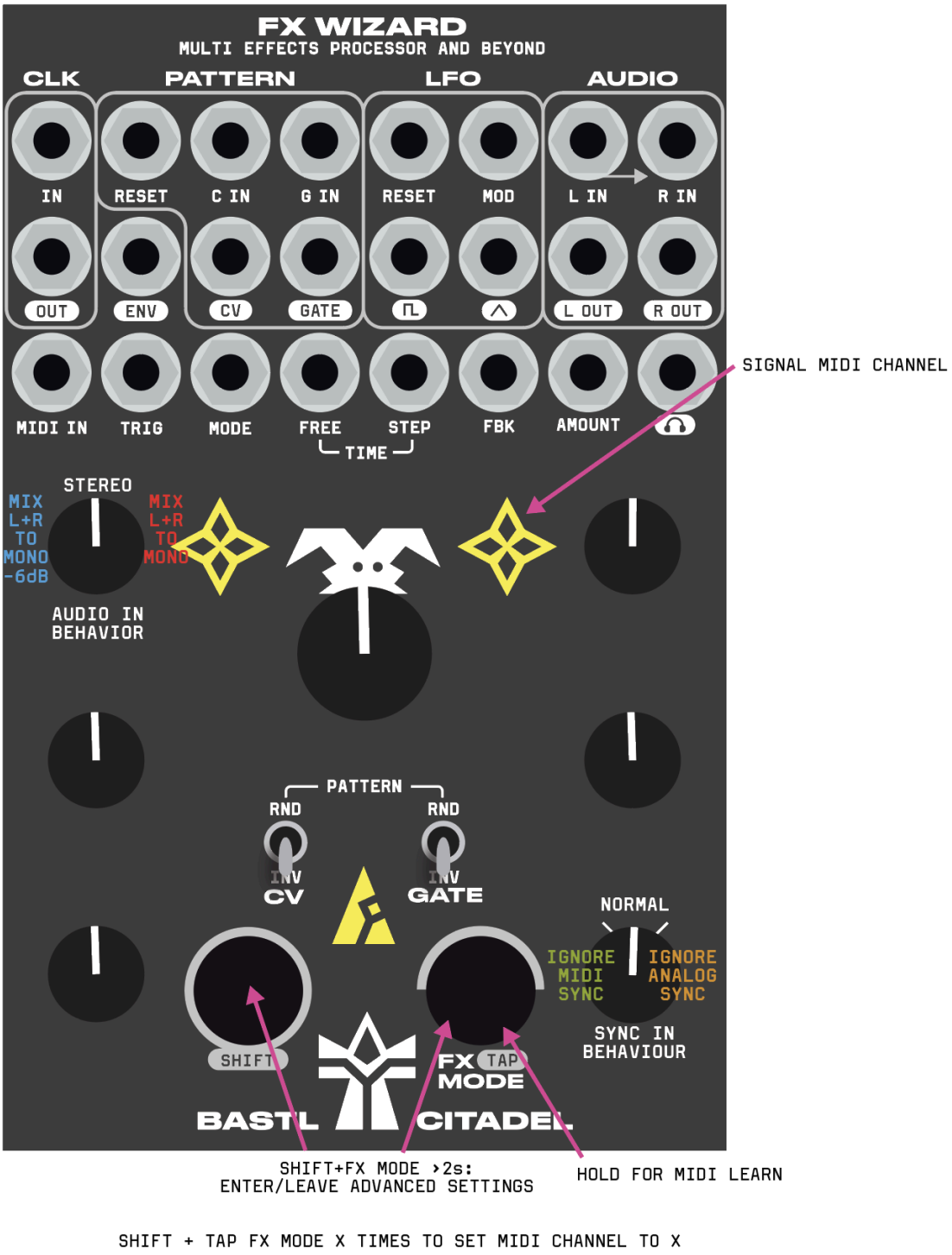
TIP: Connect varying voltages to the C IN to create semi-random and evolving sequences.

Try flipping the switch temporarily to alter the sequence partially until it fits your needs.

NOTE: The switch in the **DOWN** position or C/G IN voltage below 1.6V the sequence will continuously invert itself, making it appear **16 steps long**.

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 **CITADEL**.



SHIFT + TAP FX MODE X TIMES TO SET MIDI CHANNEL TO X

Audio Input Behavior

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

- **BLUE**: mix L+R inputs to Mono with -6dB gain. Turn the knob **left**.
- **WHITE**: Stereo input. Leave the knob in the **center position**.
- **RED**: mix L+R inputs to Mono. Turn the knob **right**.

Note: when using the RED mono mix setting and plugin only into the L input the signal will effectively boost +6dB, because it is normalised to the R input the signals will add up.

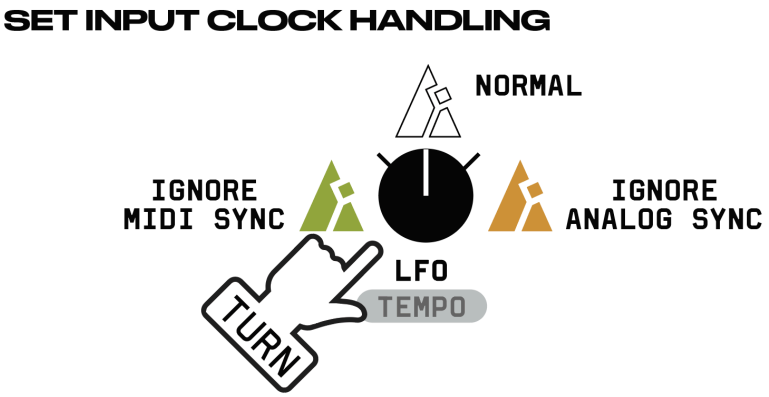
Ignore USB MIDI Clock / Sync Input

You can configure your **FX Wizard** to always use its internal clock and ignore the external clock connected via the **TRS** or **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 **CITADEL ON/OFF** (settings are automatically saved).
2. Hold **SHIFT** and **FX MODE** for 2 seconds.

MIDI IMPLEMENTATION

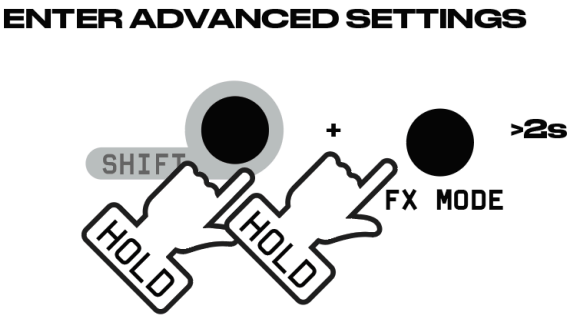
Citadel has a TRS MIDI Input (Type A) jack in the patch bay for receiving MIDI. It also can send and receive MIDI via the USB MIDI connector on the back of the module.

Setting the MIDI channel

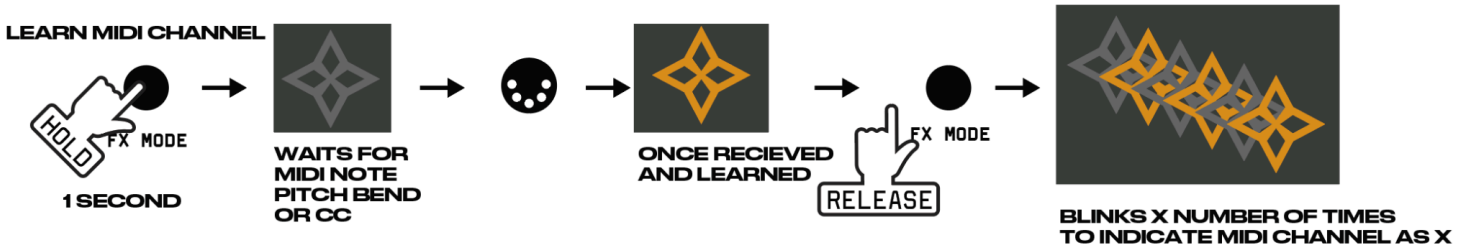
CITADEL uses the same MIDI channel for both input and output.

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

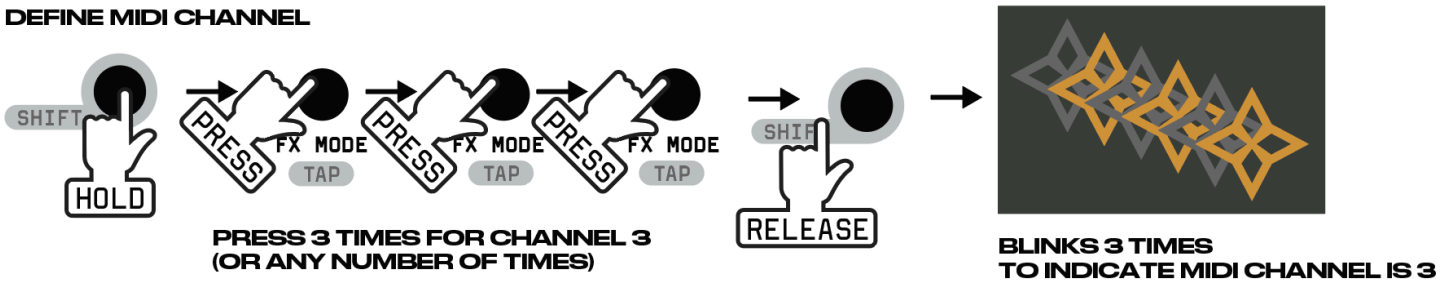


To MIDI learn the MIDI input/output channel, hold the FX MODE button for at least 1 second. The top right light will turn off.

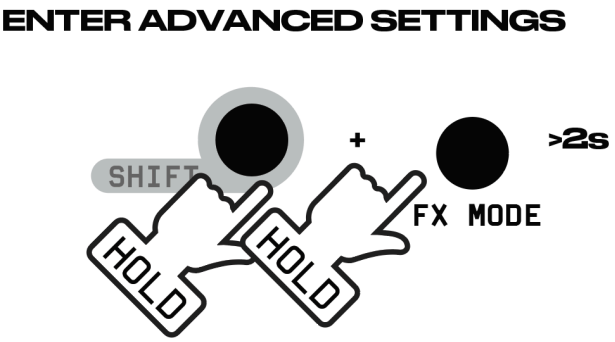
Send any MIDI message (Note, CC, or Pitch Bend). The channel of the received message will be assigned as the new MIDI input/output channel. The top right light will turn orange to confirm the assignment.

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.



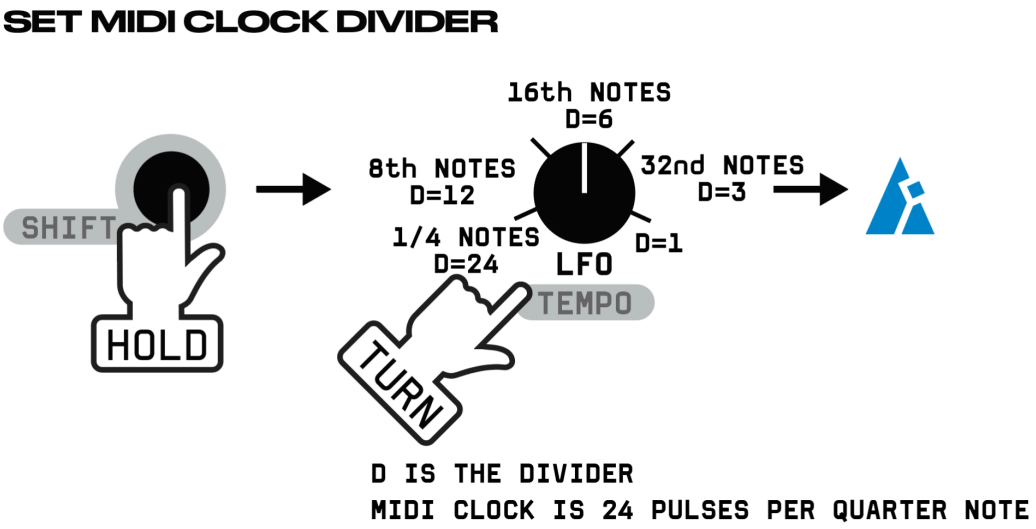
Receiving MIDI Sync (Real Time Messages)

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

Note: When a clock is received using both USB and TRS MIDI, Citadel locks onto the first arriving MIDI source for the clock. When that clock becomes inactive, it switches to the other.

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 **CITADEL** 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.

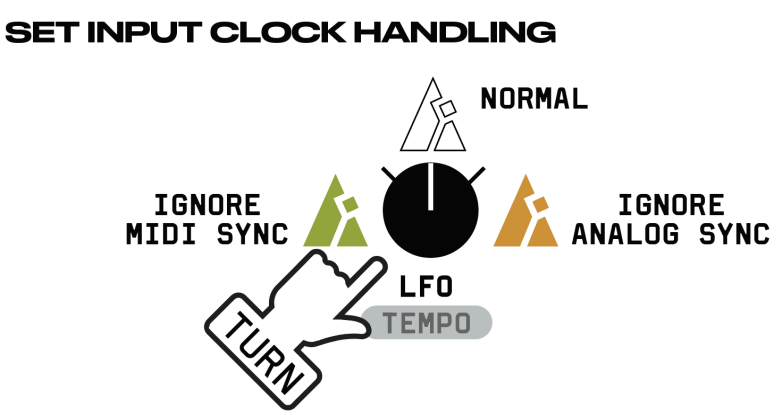
Sending MIDI sync (Real Time Messages) (only USB MIDI)

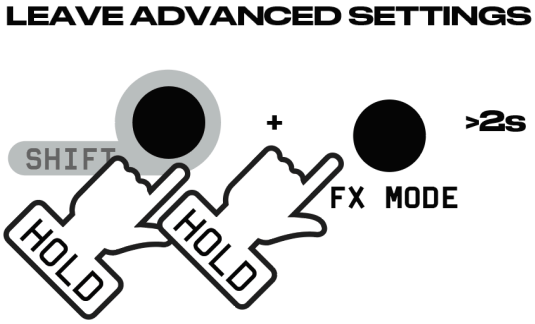
CITADEL sends out MIDI clock and transport controls only if it is NOT receiving MIDI Clock. If MIDI Clock was received during a session, you'll need to stop sending it and restart the **CITADEL**. Alternatively, you can activate the **Ignore MIDI Clock** feature in Advanced settings mode to resume sending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





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

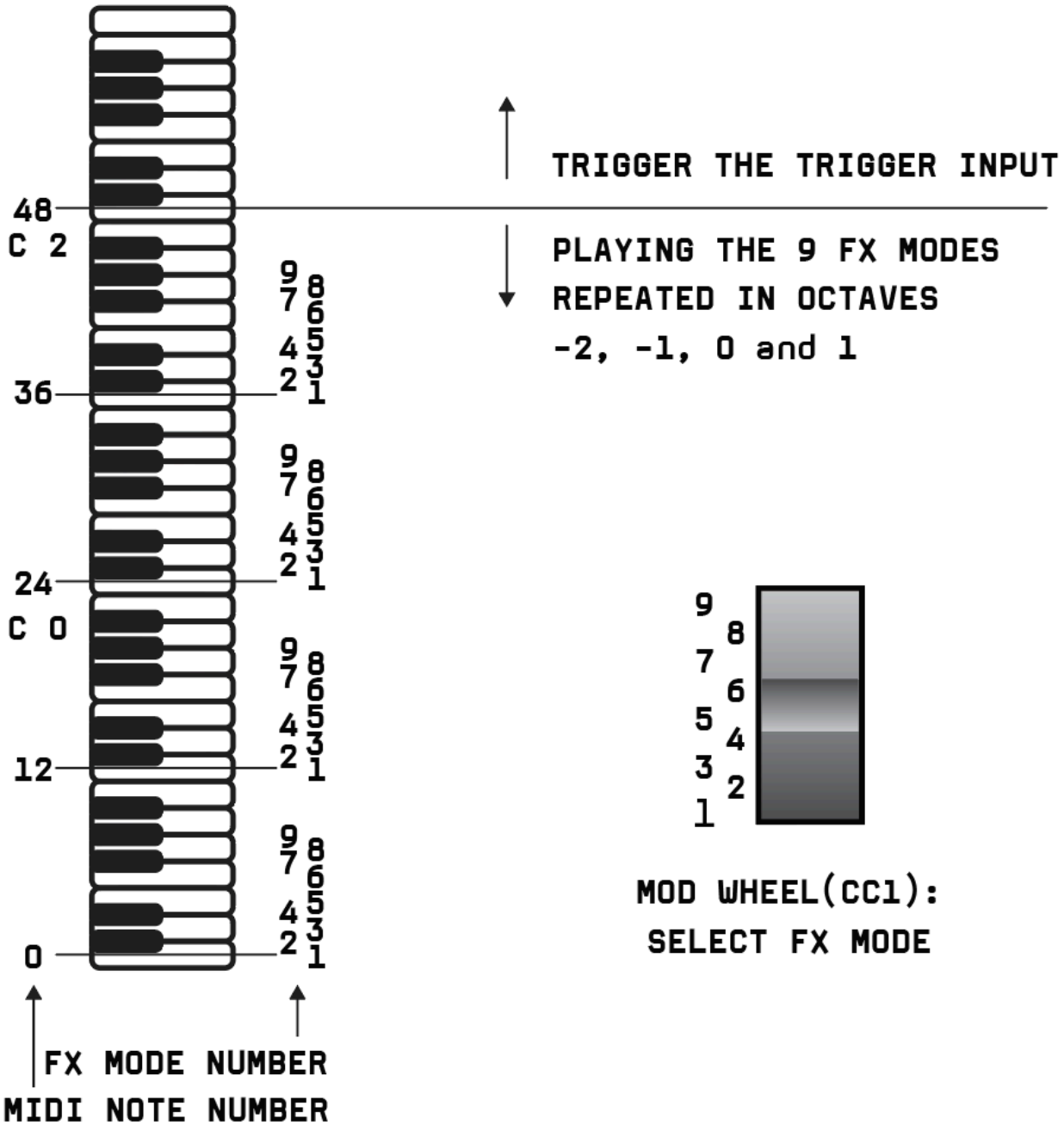
Receiving MIDI Notes

CITADEL 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.



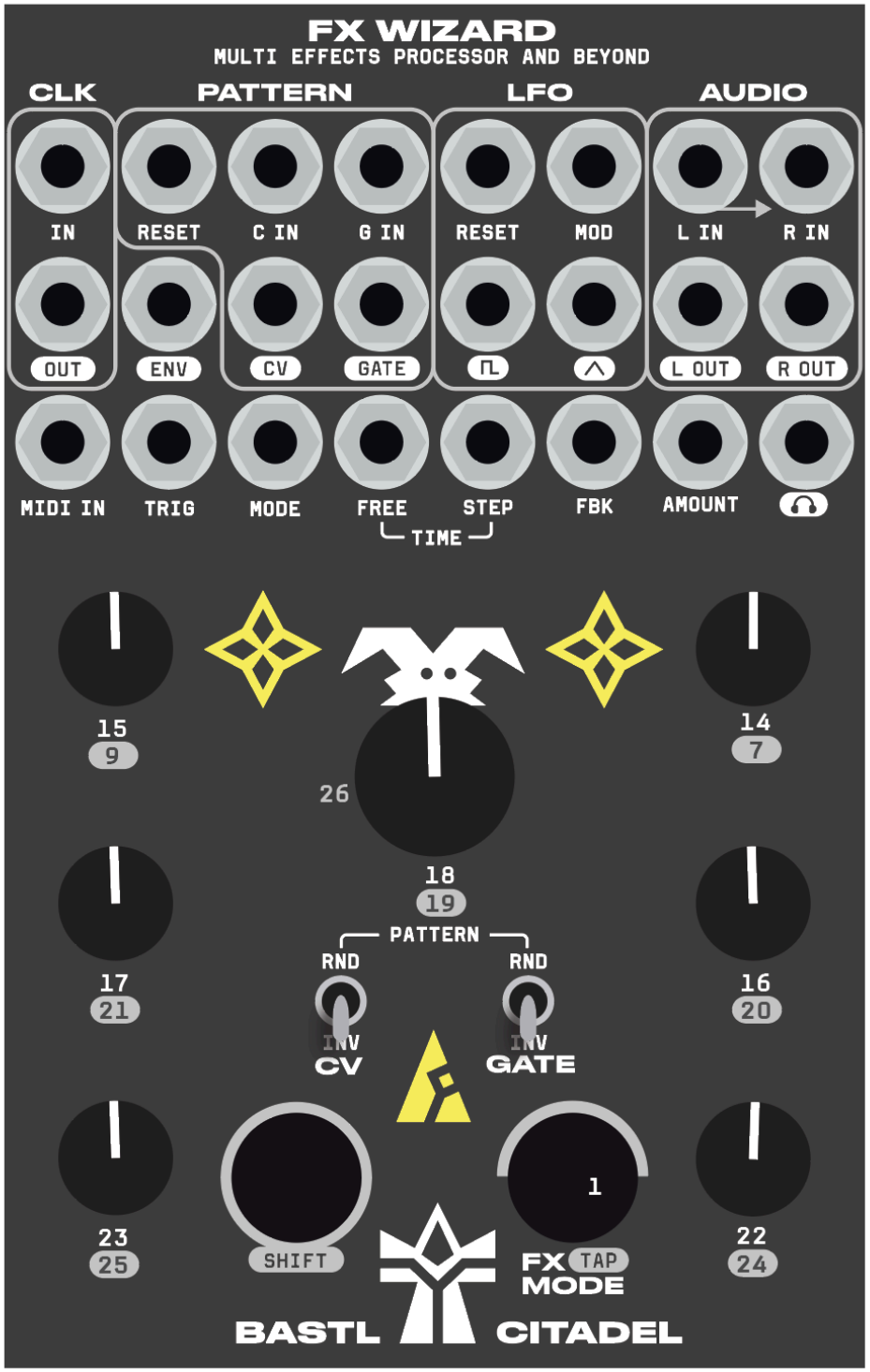
Receiving MIDI CC = Control Change / knob values

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
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 (only USB MIDI)

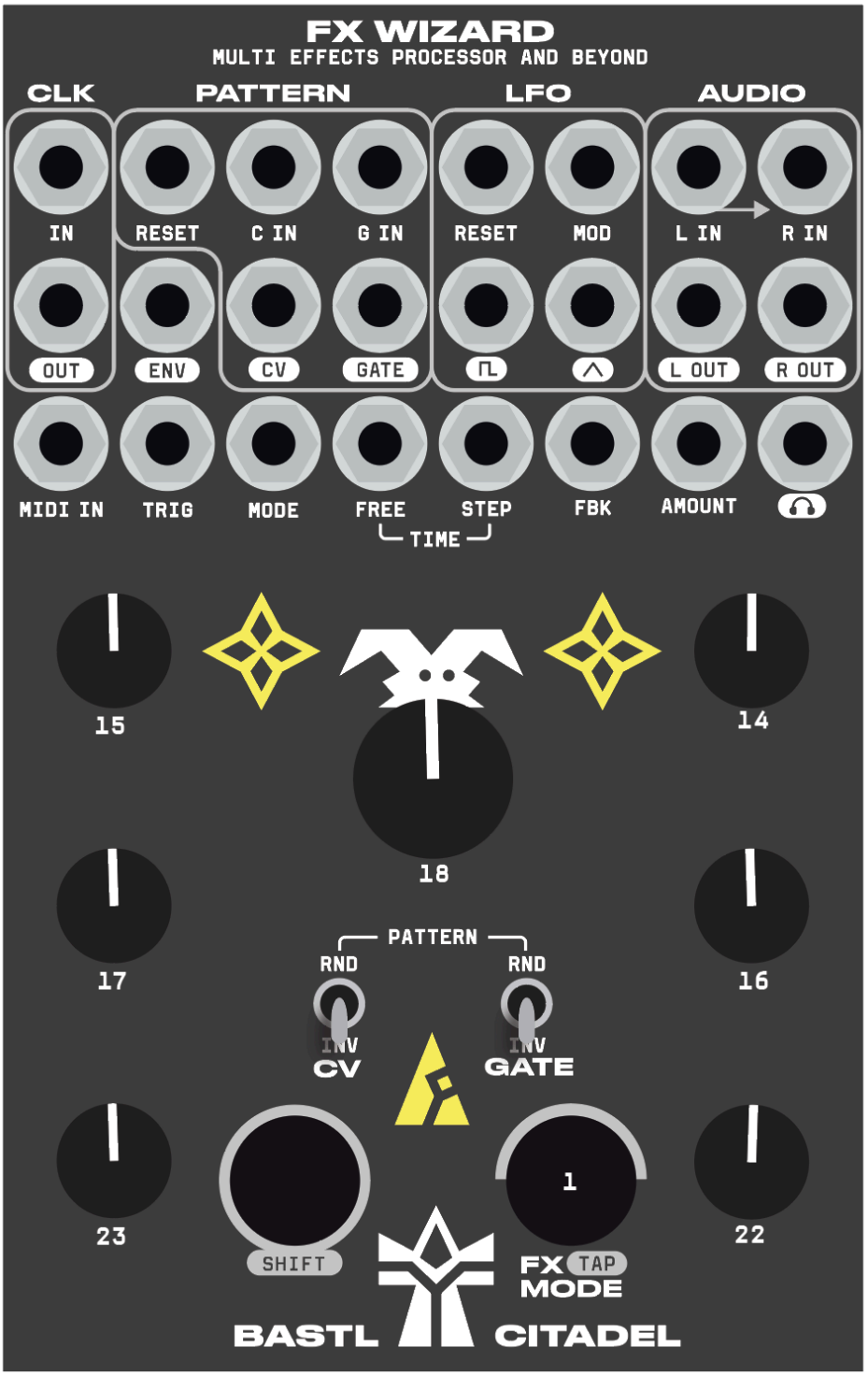
The knobs (when adjusted) send their values scaled to 0-127 on specific CC numbers.
The FX Wizard only acts as a simple knob controller.

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 **10 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) Disconnect **Citadel** from your Eurorack power!
2) Use a **USB-C cable** to connect your **Citadel** to your computer while holding the **SHIFT** button.
3) The **Citadel** will boot into **Update Mode** (no sound will play).
4) 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 **CITADEL** will announce the firmware version via its voice output.

APPENDIX

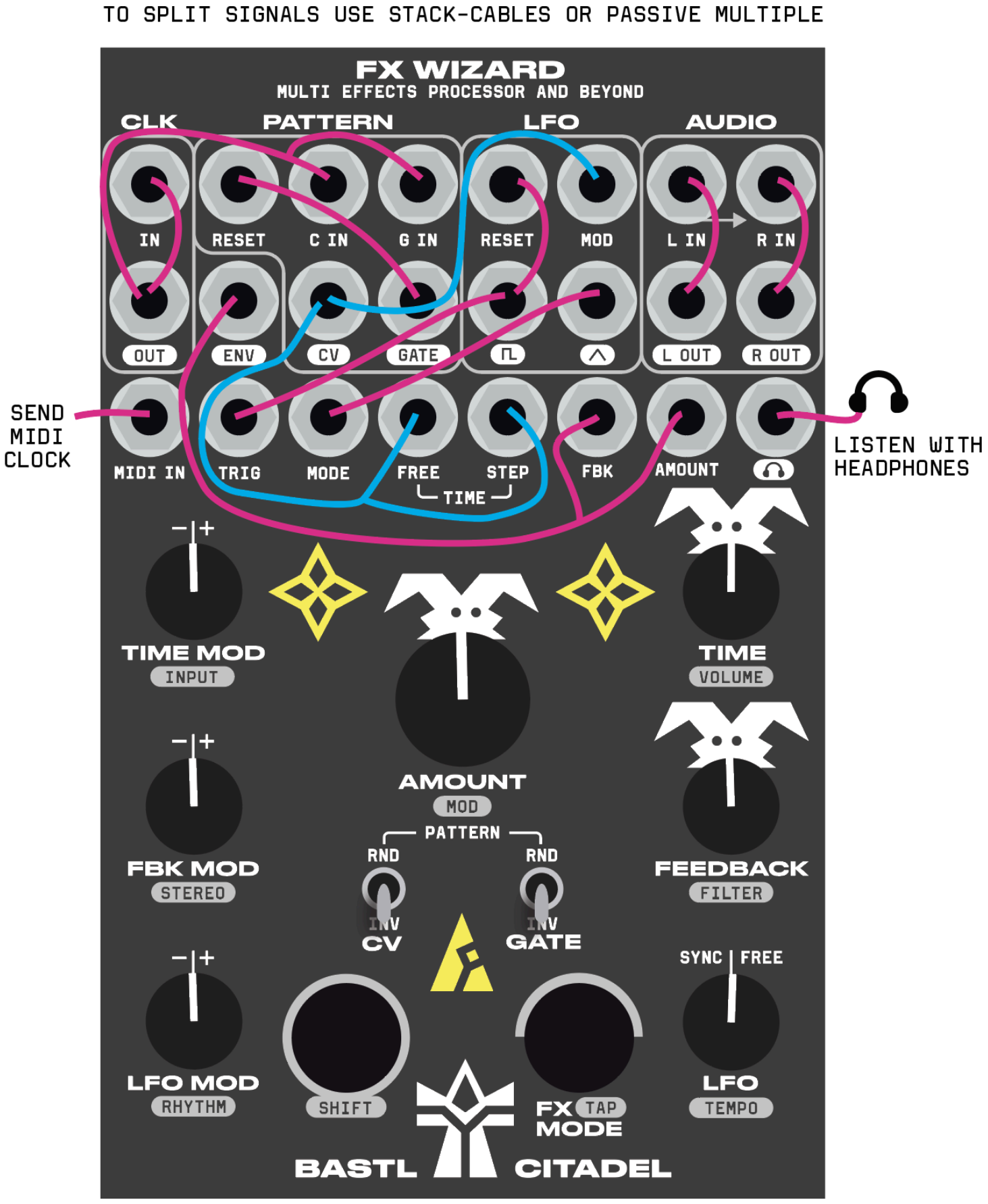
Test Mode

In order to test the hardware, **CITADEL** includes an integrated test mode. Hold FX MODE and turn power ON to enter the test mode. Listen to the headphones output: the Citadel will announce the firmware version via its voice output.

To perform the full HW test do the following:

1. Turn the power in your eurorack system **OFF**
2. Patch the following connections with patch cables (use stack-cable or passive multiple to split signals):
    a. L OUT to L IN
    b. R OUT to R IN
    c. LFO PULSE to LFO RESET
    d. LFO PULSE to TRIG
    e. CLK OUT to CLK IN
    f. CLK OUT to PATTERN “G”
    g. CLK OUT to PATTERN “C”
    h. ENV to FEEDBACK MOD
    i. ENV to AMOUNT MOD
    j. CV to FREE TIME MOD
    k. CV to STEP TIME MOD
    l. CV to LFO MOD
    m. LFO TRI to BANK IN
    n. GATE to PATTERN “R”
3. Connect headphones to the headphones output and listen to them
4. Hold **FX MODE** and turn the power the eurorack system **ON**.
5. The Citadel 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. Send MIDI Clock to the MIDI Input

11. The test should be complete and indicated by green lights, and the Citadel announcing “Test Success”.



Manual final tests

Since the automated test cannot test Toggle switches and Jack Detection on Audio Input, they need to be tested manually.

12. Keep the module ON after "Test Success" and unplug all the jacks.
13. Now test the audio inputs – the metronome light should glow green if the left or the right jack are plugged in. Test each separately.
14. Then test the toggle switches. Their state is signalised at the top two lights with the following colors:
    down = red, center = blue, up = green.

CREDITS

DEVELOPMENT TEAM: Václav Mach, Marek Mach
SUPERVISED BY: Václav Peloušek
MAIN TESTER: John Hornak
BETA TESTERS: Martin Klecl, John Dinger, David Žáček, Tomáš Niesner, Jiří Březina, Jan Pavlačka, Pavlo Shelemba, Patrik Veltruský, Peter Edwards, Florian Helling, Oliver Torr, Jakob Holm, Matěj Mžourek, Antonín Gazda, Hana Foss, boop_e, AA Battery
MANAGEMENT: John Dinger
MANUAL: Václav Peloušek, David Žáček, Martin Vondřejc
RELEASE VIDEO: Patrik Veltruský, Václav Peloušek / music: Oliver Torr / starring: Andrew Huang, BoBeats, Midlife Synthesist, Red Means Recording, Loopop
GRAPHIC DESIGN: Anymade Studio

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

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WISHING YOU THE BEST OF LUCK ON YOUR SONIC ADVENTURES!