SUPERCRITICAL

Redshift 6

MANUAL

Firmware 1.7

Last update: June 25, 2026

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Safety Instructions

FCC Information (USA)

IMPORTANT NOTICE: DO NOT MODIFY THIS UNIT!

This product, when installed as indicated in the instructions contained in this manual, meets FCC requirements. Modifications not expressly approved by Supercritical may void your authority, granted by the FCC, to use the product.

IMPORTANT:

When connecting this product to accessories and/ or another product use only high-quality shielded cables. Cable/s supplied with this product MUST be used. Follow all installation instructions. Failure to follow instructions could void your FCC authorization to use this product in the USA.

NOTE:

This product has been tested and found to comply with the limit for a Class B Digital device, under Part 15 of the FCC rules. These limits are designed to protect reasonably against harmful interference in a residential environment. This equipment generates, uses, and radiates radio frequency energy and, if not installed and used according to the instructions found in the user manual, may cause interferences harmful to the operation of other electronic devices. Compliance with FCC regulations does not guarantee that interferences will not occur in all the installations. If this product is found to be the source of interferences, which can be determined by turning the unit “OFF” and “ON”, please try to eliminate the problem by using one of the following measures:

- Relocate either this product or the device affected by the interference.
- Use power outlets that are on different branch (circuit breaker or fuse) circuits or install AC line filter(s).
- In the case of radio or TV interferences, relocate/reorient the antenna. If the antenna lead-in is 300 ohm ribbon lead, change the lead-in to coaxial cable.
- If these corrective measures do not bring any satisfactory results, please the local retailer authorized to distribute this type of product. If you cannot locate the appropriate retailer, please contact Supercritical.

For Canada

NOTICE:

This class B digital apparatus meets all the requirements of the Canadian Interference-Causing Equipment Regulation.

AVIS:

Cet appareil numérique de la classe B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

European Union Regulation Compliance Statement

This product has been tested and found to comply with the Low Voltage Directive 2014/35/EU and the Electromagnetic Compatibility Directive 2014/30/EU.

Maintenance Instructions

• Read these instructions.

• Use the unit only with the supplied power adapter.

• Connect the power adapter to the correct voltage (voltage is marked on the power adapter).

• Protect the power adapter cord from being walked on, and do not place heavy objects on it.

• Do not drop or subject to a strong impact.

• Do not place heavy objects on the unit or block the ventilation of the unit.

• Do not use this unit near water.

• Do not expose the unit to rain, moisture, dripping, or splashing water.

• Do not expose the unit to direct sunlight or use it in temperatures exceeding 40°C.

• Do not store the unit in hot or damp conditions.

• Do not place the unit next to heat sources such as radiators and other heat-producing apparatuses.

• Do not open the unit or insert anything into the unit. This may cause an electric shock or a fire.

• Use a dry soft cloth to clean the unit. Do not use chemicals like benzene, thinners,

Alcohol, solvents, or aggressive cleaners for cleaning the unit.

• Do not use the unit during thunder or lightning.

• Avoid using the unit extended times at high volume to avoid any hearing loss.

• Turn off the unit immediately if an abnormality or malfunction occurs

Credits

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...and all our other beta testers on Discord, huge thanks!

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We would like to thank:
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Frank Rüffel
Hendrik Rüffel
Edgars Saulitis
Everyone at Alex4

All the Redshift 6 users, and everybody else who has contributed to production or development, with discussions, support or just helping us stay sane under pressure!

Turning the Redshift 6 On and Off

NOTE:
Before connecting the Power Adapter to the wall current, make sure that the Power Adapter is using the correct power plug for the region.

Turning the Power On

Before turning on the Redshift 6, always make sure that the volume is turned all the way down. You can hear some sound when switching on the unit, even when the volume is turned down. This is completely normal and not a sign of any malfunction.

1. Before turning on the Redshift 6, make sure that the connected equipment is powered off.
2. Turn the Volume knob all the way to the minimum volume.
3. Turn on the Power switch located in the left corner of the rear panel.
4. Switch on the equipment connected to the unit and adjust the level of volume to the desired level.

Turning Off the Power

1. Before turning off the power, turn the volume on the connected equipment to the minimum.
2. Turn off the power from all the audio devices connected to the Redshift 6.
3. Turn off the Power from the Redshift 6.

NOTE:
Do not power off the Redshift 6 while updating the firmware.

Introduction

Foreword

Congratulations!

You're holding a Redshift 6, our first polyphonic desktop synthesizer, in your hands. The main idea of the Redshift 6 is to update some of the classic analog synthesizer designs and concepts to the 2020s, to have the modern conventionals, and to keep the classic polyphonic spirit in its analog heart. It should always be in tune (unless wanted to) and it should always sound the same (unless wanted to) when choosing the same preset.

Apart from the hardware, software-wise it is meant to be evolving for a long time span. We hope to unlock plenty more features that this hardware allows. Be sure to check out the newest firmware at our website www.supercriticalsynthesizers.com with the updates on the firmware development.

The Redshift 6 synthesizer is our contribution to the analog polysynth tradition.

We hope you like it.

Sincerely,
The Supercritical Team
Tampere
Finland

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How to Use This Manual

This manual is structured to guide you through Redshift 6 in a logical sequence of topics. It's designed so that beginners can read it from start to finish, covering the fundamental concepts first. As you progress, the manual delves into more advanced topics.

For experienced users, this manual serves as a helpful reference, allowing you to navigate directly to relevant sections as needed. Lastly, the Appendices offer detailed information about the Redshift 6.

Typographic Conventions

To keep this manual easy to read, we've taken the following steps with naming whenever possible:

- The name of a physical knob, button, or LED is printed inside square brackets **[NAME]**. Usage example:
    - Turn the **[CUTOFF]** knob.
- The 8 Soft Knobs, located around the display, have variable functions, depending on the display page. They are referenced as **<ParameterName>** Soft Knob. Usage example:
    - Press the **[AMP]** button and turn the **<Pan>** Soft Knob.
- Alternative functions can be accessed by holding the **[SHIFT]** button and pressing another **[NAME]** button or knob, or turning **[NAME]** knob. Usage example:
    - While holding the **[SHIFT]** button, press the **[KEY]** button.
    - Press **[SHIFT] + [KEY]**.
- Some buttons have switchable ENGINEs, which are referenced as "**BUTTON: ENGINE NAME**".
    - While holding the **[ENGINE]** button, all buttons with assignable engines will light up to indicate their availability.

NOTE:
All knobs, except **[VOLUME]**, also function as a button.

Key Terminology

This list of a few term definitions helps you to get a head start on some of the technical expressions in this manual.

Voice
In a polyphonic synthesizer, a voice is a basic component containing all the hardware and software required to generate a sound. The Redshift 6 features six voices, meaning it has six independent "sound-producing components." These voices are triggered when MIDI Notes are received.

Polyphonic
When using the Redshift 6 polyphonically, each note uses one voice (or more) with independent control of all sound parameters, including pitch (DCO), timbre (VCF), and amplitude (AMP). It supports up to six simultaneous voices, which gives the Redshift 6 its name.

Paraphonic
A single voice of the Redshift 6 can handle multiple notes simultaneously, each with independent pitch and amplitude control. However, these notes share the same signal path—including the filter. The advantage is that chords can be played using just one voice, freeing up the remaining voices for other sounds. The trade-off is that filter movements and similar effects apply to all notes together, not individually.

Unison
In unison mode, the Redshift 6 uses multiple voices for every note. Although this reduces overall polyphony, the detuned and stereo-spread voices produce a richer, more powerful sound.

Preset
A preset holds all the parameters that control a voice to produce a particular sound. Each preset can contain 1 to 6 independent parts, with each part having its own complete set of parameters - an individual sound.

Multitimbral
In a polyphonic synthesizer, multitimbral refers to the ability to generate multiple distinct sounds (timbres) simultaneously. It’s essentially like having several synthesizers in one, each capable of playing its sound independently and controlled on separate MIDI channels.

Part
A part is an element of the Redshift 6's multitimbral architecture. Each part can produce its distinct sound and can be split across the keyboard, layered with other parts, or controlled independently via separate MIDI channels. Each part has its own value for each parameter, including settings for modes like polyphony, unison, and paraphony. All parts are saved together in a preset.

Overview

Redshift 6 Synthesizer

The Redshift 6 synthesizer combines technology from Supercritical's previous products, the Demon Core Oscillator and the Neutron Flux Filter. Each of the six voices features a DCO with analog waveforms generated under digital control. The filter core is an analog 4-pole state variable filter also digitally controlled to act like almost any classic vintage synthesizer filter.

Redshift 6's idea is something that is wrapped in the moniker "Variable Character Synthesizer". Each voice's analog path regarding tuning, gain staging, filter, and more is under strict digital control. Redshift 6 has a lush and warm sweet spot inspired by the analog polysynth tradition, but it can also cover the full range from almost digitally sterile and clean to distorted misbehavior and beyond. The signal path is all analog until the bypassable stereo DSP effects processor.

Engines

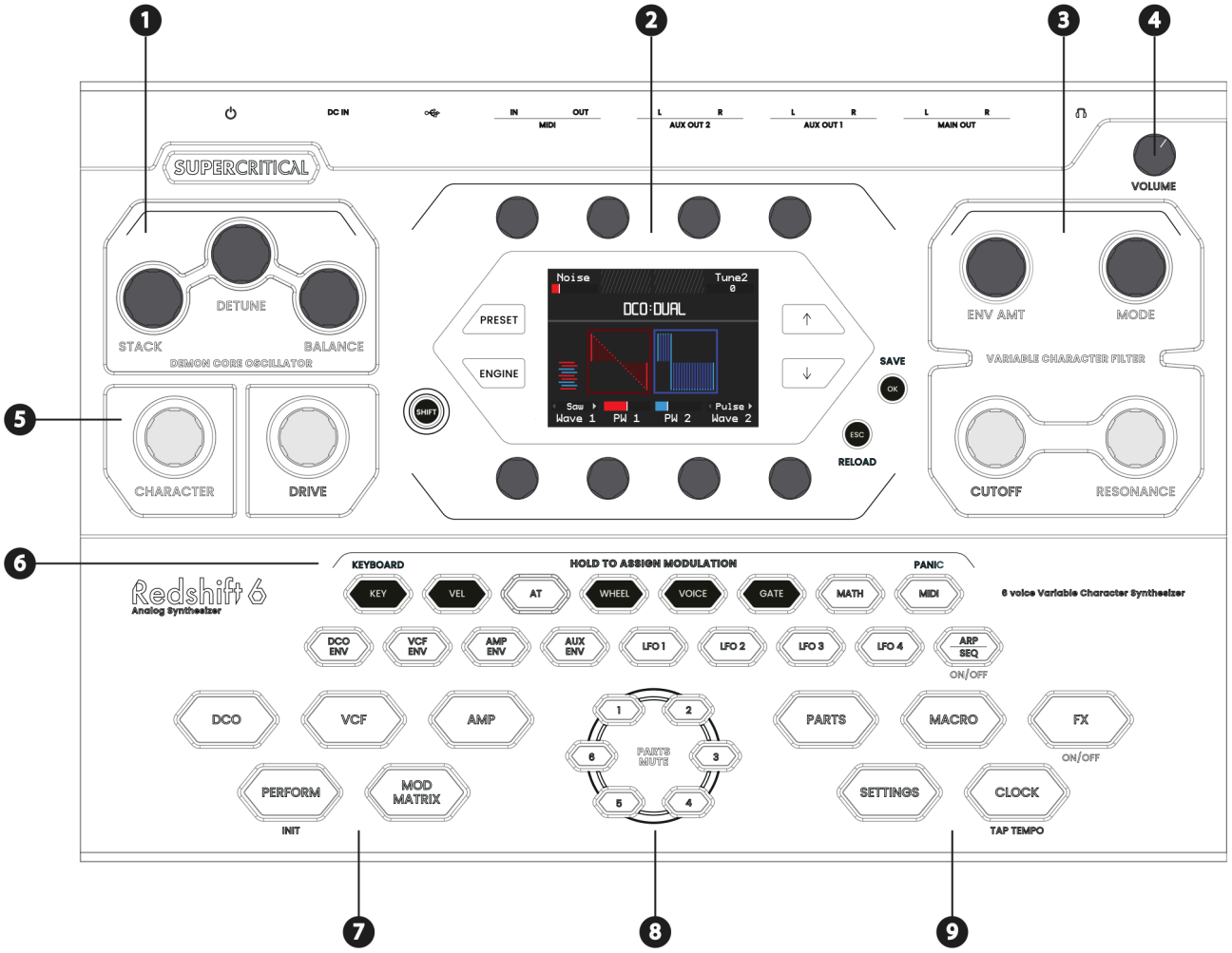
Some pages on Redshift 6 offer multiple operating engines. Engines provide access to deeper synthesis and processing modes while keeping the interface streamlined. Because the display presents eight soft-knob parameters per screen, engines group the broader set of available controls into focused, usable parameter pages—no additional screens or menu navigation required.

While a page that holds alternative engines is currently selected, pressing the **[ENGINE]** button opens the engine selection page, where you can browse available engines using the **[↑]/[↓]** buttons and confirm your choice with **[OK]**. Each engine remembers its own parameter settings, allowing you to explore alternative sound directions and return to previous choices at any time.

TIP:
Holding the **[ENGINE]** button highlights all buttons with selectable engines by lighting their LEDs. While holding **[ENGINE]**, press any highlighted button to jump directly to its engine options. After releasing the **[ENGINE]** button, use the **[↑]/[↓]** and the **[OK]** buttons to confirm your choice.

Alternatively, while holding the **[ENGINE]** button, pressing the highlighted button repeatedly scrolls the list, and releasing the **[ENGINE]** button confirms the selection.

Front Panel Descriptions



1. Demon Core Oscillator

2. Interface and Display

3. Variable Character Filter

4. Volume (for main out and headphones)

5. Character & Drive

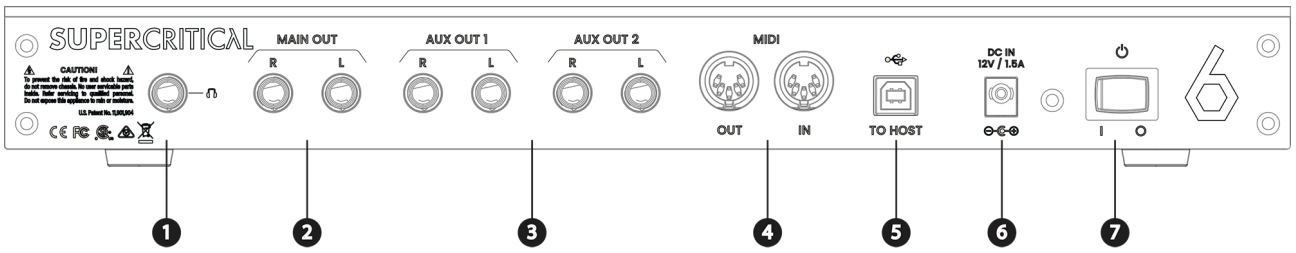
6. Modulation Grid

7. Part Grid

8. Parts Selector Grid

9. Global Grid

Rear Panel Descriptions

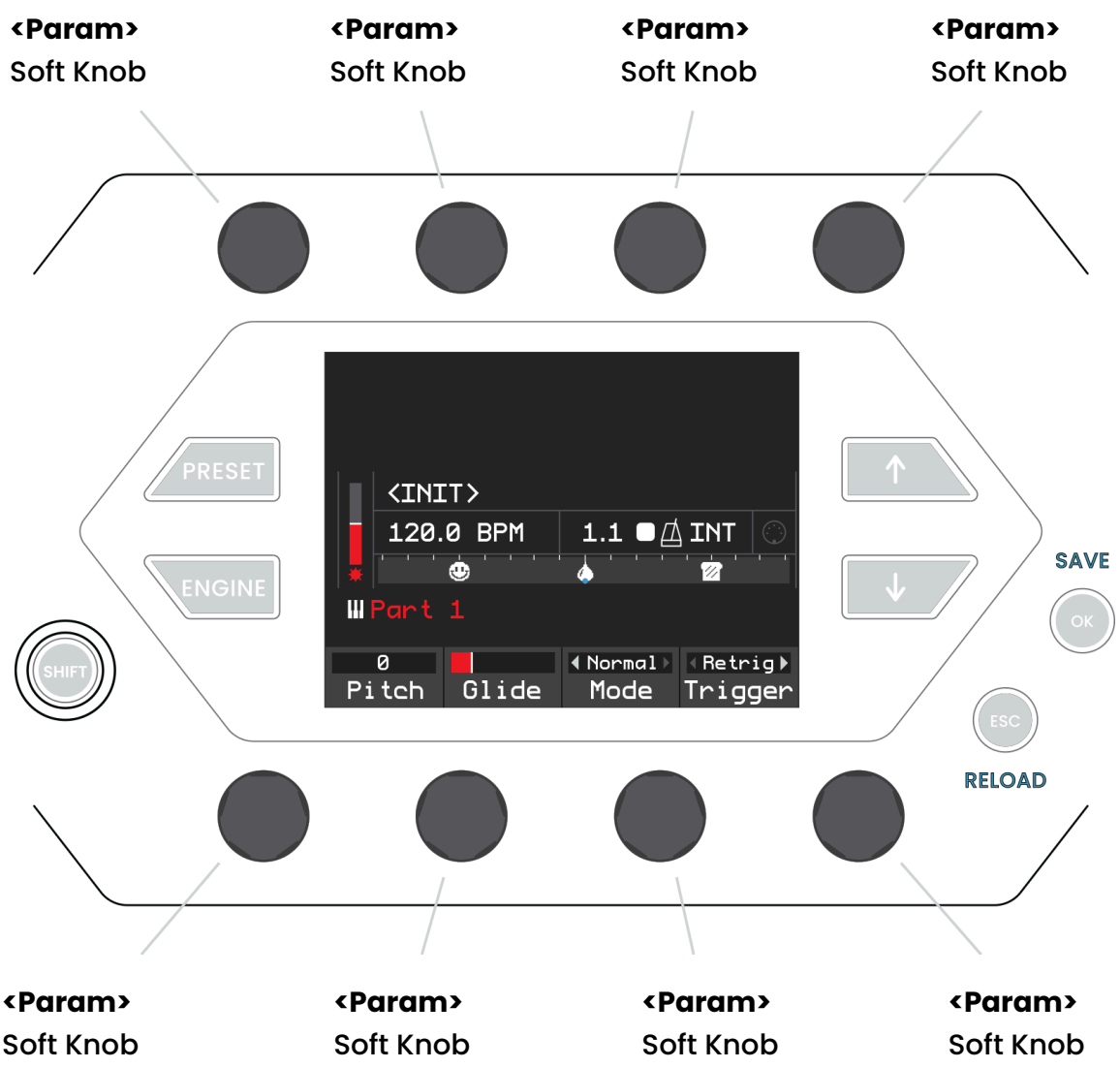


1. **HEADPHONES** - Stereo TRS headphone output.
2. **MAIN OUT** - Pseudo-Balanced TRS, line-level audio outputs.
3. **AUX OUT 1 & 2** - Pseudo-Balanced TRS, line-level auxiliary audio outputs.
4. **MIDI** - MIDI input and output for transmitting and sending MIDI data.
5. **USB** - USB connection to a computer.
6. **DC IN** - Input for the power adapter.
7. **POWER SWITCH** - Turns Redshift 6 On/Off.

NOTE:
Redshift 6 is a class-compliant USB device that needs no drivers on PC, Mac, or Linux. The USB 2.0 port enables bidirectional MIDI communication with a computer but does not transmit audio.

Interface and Display

The interface and display section controls the various parameters of the Redshift 6 synthesizer. Redshift 6's user interface is designed to keep the menu diving minimal. The eight clickable **Soft Knobs** around the display provide quick and easy parameter adjustment. The 2.7" TFT IPS color display shows which parameters can be adjusted with the Soft Knobs.

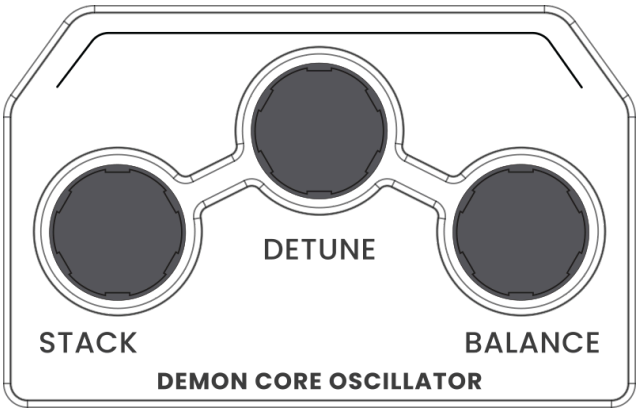


- The eight **Soft Knobs** around the display are used to select and adjust the parameters shown on the display.
- The arrow **[↑] [↓]** buttons are used for moving up and down on the display and other functions depending on the page.
- The **[PRESET]** button opens up the list of presets.
- The **[ENGINE]** button changes the engine for the selected page.
- The **[SHIFT]** button is used for accessing alternative functions on buttons that have two functions and fine-tuning values adjusted via knobs.
- The **[OK]** button confirms the selection, and the alternative function **[SAVE]** saves the current preset.
- The **[ESC]** button exits from the selection/menu, and the alternative function **[RELOAD]** reverts the current preset to the last saved state.

Demon Core Oscillator

The Demon Core Oscillator is a digitally controlled analog oscillator circuit MDCO (Multiperiod Digitally Controlled Oscillator), our innovation, that is featured in each of Redshift 6's six voices. The circuit is capable of forming up to 16 simultaneous oscillators with separate pitch, amplitude, and phase control.

- The **[STACK]** knob controls the number of oscillators.
- The **[DETUNE]** knob controls the amount of detuning between the oscillators.
- The **[BALANCE]** knob controls the amplitude of the oscillators.

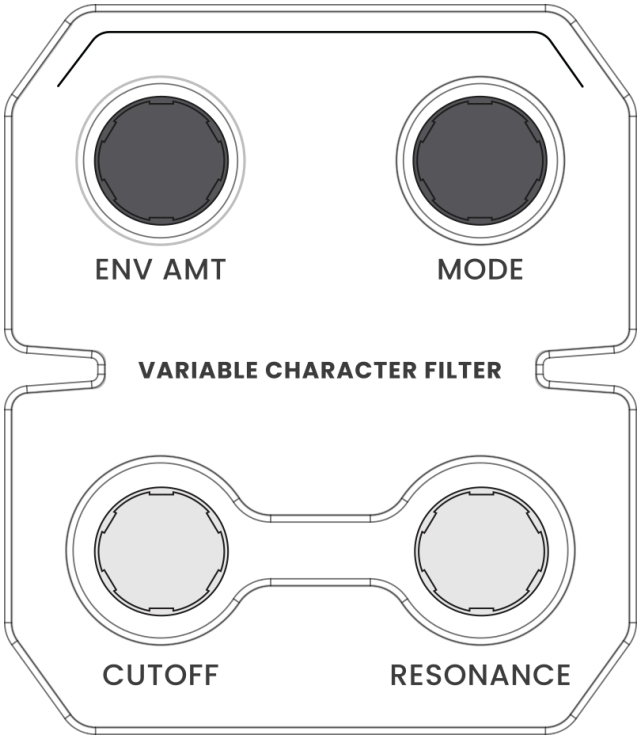


NOTE:
Knob functions can vary depending on the selected DCO engine.

Variable Character Filter

Redshift 6's filters are analog 4-pole state variable filters with digital control. Each voice features a single analog filter, but in future updates, the voices can be chained to form chains of 8 pole filters or even more interesting filters. The filter does not do any modeling but can be configured to function like almost any analog synthesizer filter.

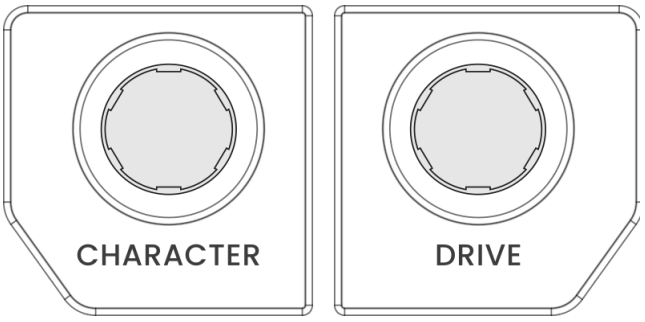
- The **[CUTOFF]** knob controls the cutoff frequency of the filter.
- The **[RESONANCE]** knob controls the amount of emphasis on a narrow band near the cutoff frequency.
- The **[MODE]** knob changes the filter mode.
- The **[ENV AMT]** knob controls the intensity of the filter envelope modulating the filter's cutoff frequency.



Character and Drive

With different character profiles, each voice's analog signal path regarding tuning, gain staging, filter, amp, and envelope behavior can be changed from almost digitally sterile and clean to distorted misbehavior and beyond.

- The **[CHARACTER]** knob selects the Character profile.
- The **[DRIVE]** knob controls the amount of pre and post-filter gain.



TIP:
Hold the **[SHIFT]** button while turning the **[CHARACTER]** knob to interpolate between the characters.

NOTE:
The **INIT** preset's default **[DRIVE]** amount is optimized for polyphonic sounds. For paraphonic patches, try reducing the setting; for monophonic sounds, try increasing it.

Character descriptions

Liquid Spacey resonance, filter pings dripping with dew.

Crisp A bright state variable filter.

Fat Our take on a ladder-ish filter character.

Sour The squelchy acid thing.

Mean Highly unstable, bad behavior, and distortion.

The sound character of a synthesizer is shaped by several factors, including filter response, gain staging, envelope shape, tuning stability, and the subtle variations between voices. In Redshift 6, these characteristics are controlled through a combination of analog circuit design and their control algorithms. Using our ultra-flexible filter design from the Neutron Flux Filter, variable gain staging, the fine-tuning capabilities of the DCO, and digital control of all these, we're able to approximate many very different characters. We've packaged five of them to the Character control of the Redshift, and as an extra treat, we let you interpolate between them to find your perfect sweet spot

Getting Started

Follow the steps to get your Redshift 6 up and running:

1. Connect the Power Adaptor to the DC IN.
2. Turn on the Redshift 6.
3. Connect your headphones, or connect the Main Out to your amp/mixer/powered speaker and turn up the volume.
4. Connect your DAW, controller, or keyboard with USB or MIDI.
5. Turn up the volume on the Redshift 6.

TIP:
You can also use the internal keyboard to play the synthesizer.

Internal Keyboard

To play the sounds without any external controller, use the Redshift 6's internal keyboard mode.

To access the Internal Keyboard:

- Hold **[SHIFT]** while pressing the **[KEY]** button. The Modulation Grid buttons now function as a Musical Keyboard, ranging from C to D one octave higher. Use the **[SHIFT] + [↑] [↓]** arrow buttons to change the octave.
- Exit the Internal Keyboard mode by pressing the **[SHIFT] + [KEY]**. If you exit while a note is held, the note will remain latched, functioning like a sustain pedal.

NOTE:
Modulation Grid cannot be accessed while the Internal Keyboard is in use.

NOTE:
The internal keyboard will always play on the Perform MIDI channel (=currently selected part).

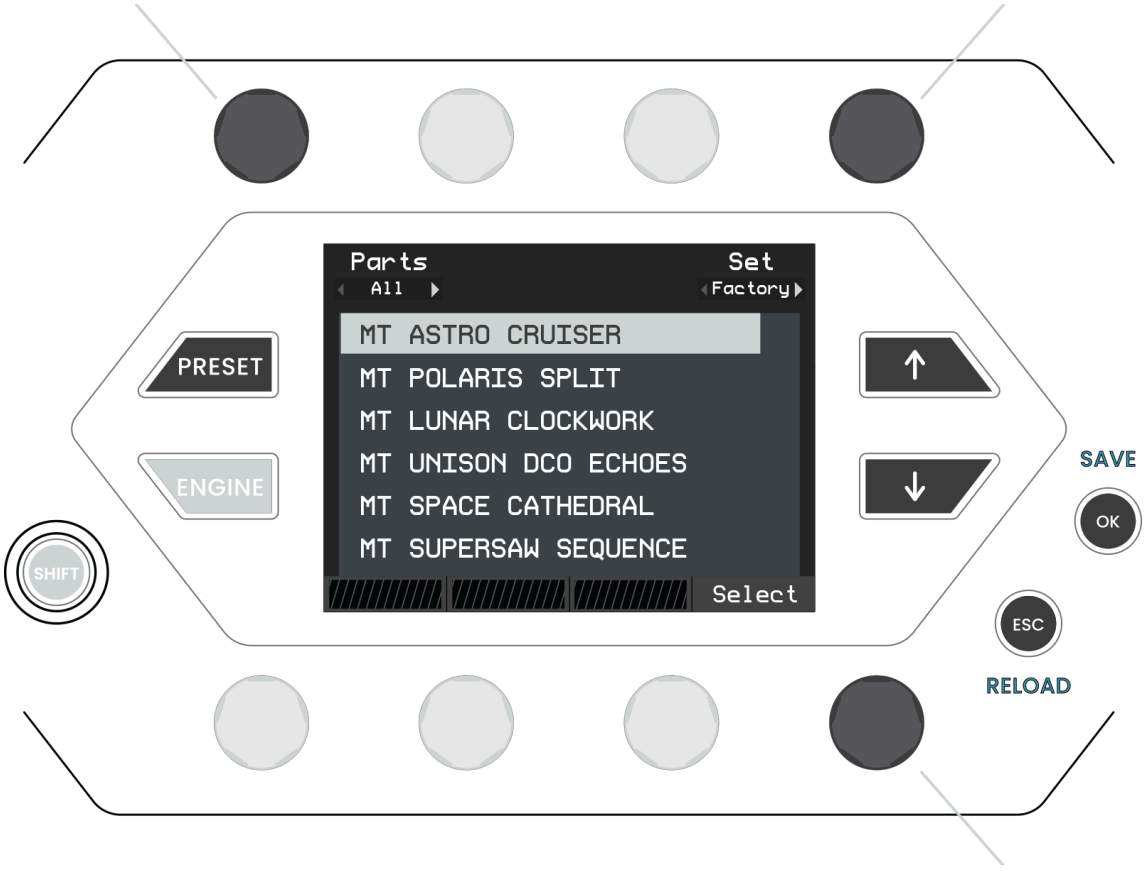
Selecting a Preset

Redshift 6's memory is divided into two parts, **FACTORY** and **USER**.

- The **FACTORY** set contains the presets which cannot be overwritten or deleted.
- The **USER** set contains the user presets. When shipped, the **USER** set is empty.

‹Parts›

‹Factory/User›
Selects between sets



‹Choose›
Select between presets
Push to select

- Press the **[PRESET]** button to preview presets with the **Soft Knobs** or the **[↑] [↓]** buttons buttons. In preview mode, presets cannot be edited.
- Press the **[OK]** button or the **‹Choose›** Soft Knob to select and edit.

Saving a Preset

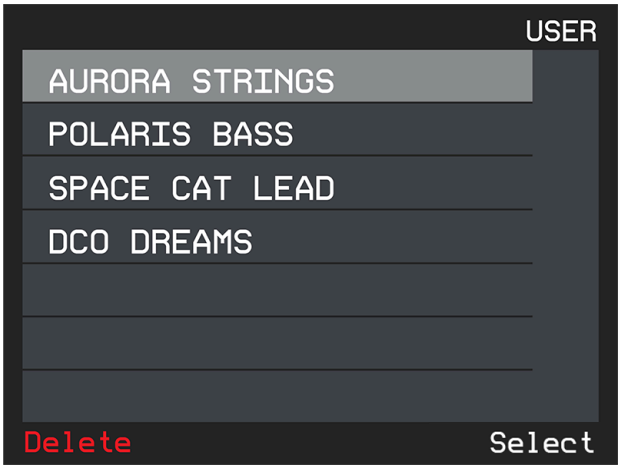
To save a user preset, hold the **[SHIFT]** button and press the **[OK]** button.

- **<Cursor>** Soft Knob moves the cursor.
- **<Edit>** Soft Knob selects a letter or a number.

After naming, the preset can be saved by pressing the **[OK]** button.

Deleting a Preset

Select the preset to be deleted with the **<Choose>** Soft Knob and confirm by pushing the **<Delete>** Soft Knob.



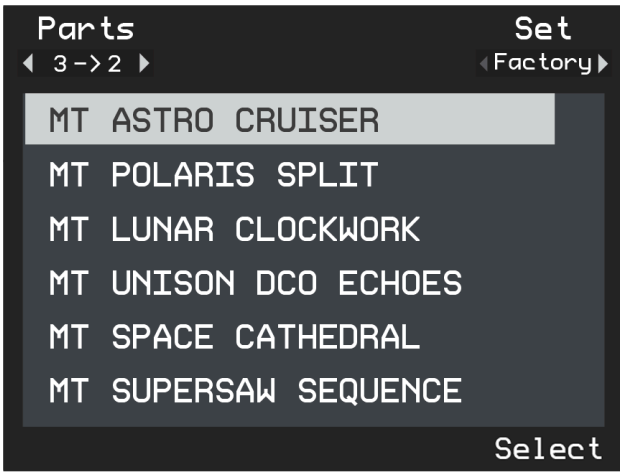
The deletion of the selected preset is confirmed by pressing the **[OK]** button.

Deleting the preset can be canceled by pressing the **[ESC]** button.

Loading a Single Part from a Preset

To load a single part from a preset:

- Choose the preset that will receive the copied part (destination).
- Press the **[PRESET]** button and turn the **<Parts>** Soft Knob to preview a part of the selected preset (source).
- Select the destination part by pressing the **[1-6]** button on the Parts Grid.
- Press the **[OK]** button to confirm.



NOTE: The Part is previewed in the context of the active Preset—effectively as if it were already loaded into the selected Part. To hear only the selected Part, mute the others by pressing **[SHIFT] + [1–6]**.

Alternative Functions with [SHIFT]

Some buttons have alternative functions that are indicated with light blue text next to the button. These functions can be accessed while holding the **[SHIFT]** button.

- **INIT** = **[SHIFT]+[PERFORM]** - initializes the current preset.
- **INIT ACTIVE PART** = **[SHIFT]+[PART]** - initializes the current part.
- **SAVE** = **[SHIFT]+[OK]** - saves the current preset.
- **RELOAD** = **[SHIFT]+[ESC]** - reloads the last saved state of the current preset.
- **KEYBOARD** = **[SHIFT]+[KEY]** - turns the Modulation Grid into a mini keyboard.
- **KEYBOARD OCTAVES = [SHIFT] + [↑] [↓]** - changes the octave of the internal keyboard.
- **TAP TEMPO** = **[SHIFT]+[CLOCK]** - tap tempo for the internal master clock.
- **PANIC** = **[SHIFT]+[MIDI]** - sends MIDI Reset message.
- **FX ON/OFF** = **[SHIFT]+[FX]** - bypasses master output DSP effects. Not yet implemented.
- **ARP|SEQ ON/OFF** = **[SHIFT]+[ARP|SEQ]** - bypasses arpeggiator or sequencer.
- **PARTS MUTE** = **[SHIFT]+[PARTS 1-6]** - mutes parts.

NOTE: To activate alternative functions, the **[SHIFT]** key must be held until all other buttons are released.

Parameter Fine-tuning

The **[SHIFT]** button also functions as a fine-tuning mode for all knobs. Hold the **[SHIFT]** button while turning any knob (except **[Volume]**) for precise adjustments.

TIP: Some parameters have fixed steps that can be accessed by pressing the knob while adjusting.

SHIFT Lock

Shift Lock mode removes the need to hold the button while adjusting a parameter.

- Double-click the **[SHIFT]** button to activate the SHIFT LOCK.
- To cancel, press the **[SHIFT]** button again, or the **[ESC]** button.

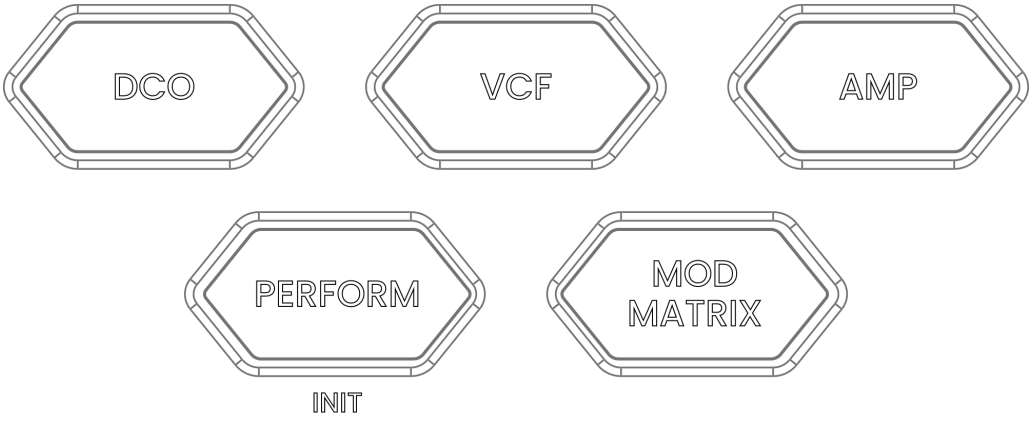
Part Grid

Part Grid holds the building blocks for making sounds.

Sounds contain three elements:

- pitch (frequency)
- timbre (brightness)
- amplitude (loudness)

In the Redshift 6 synthesizer, these elements can be controlled on the following blocks:



- The **[DCO]** button shows the pitch-related parameters.
- The **[VCF]** button shows the timbre-related parameters.
- The **[AMP]** button shows the amplitude-related parameters.

Parts Grid also contains:

- The **[PERFORM]** button shows the performance-related parameters.
- The **[MOD MATRIX]** button shows all the assigned modulations and their parameters.

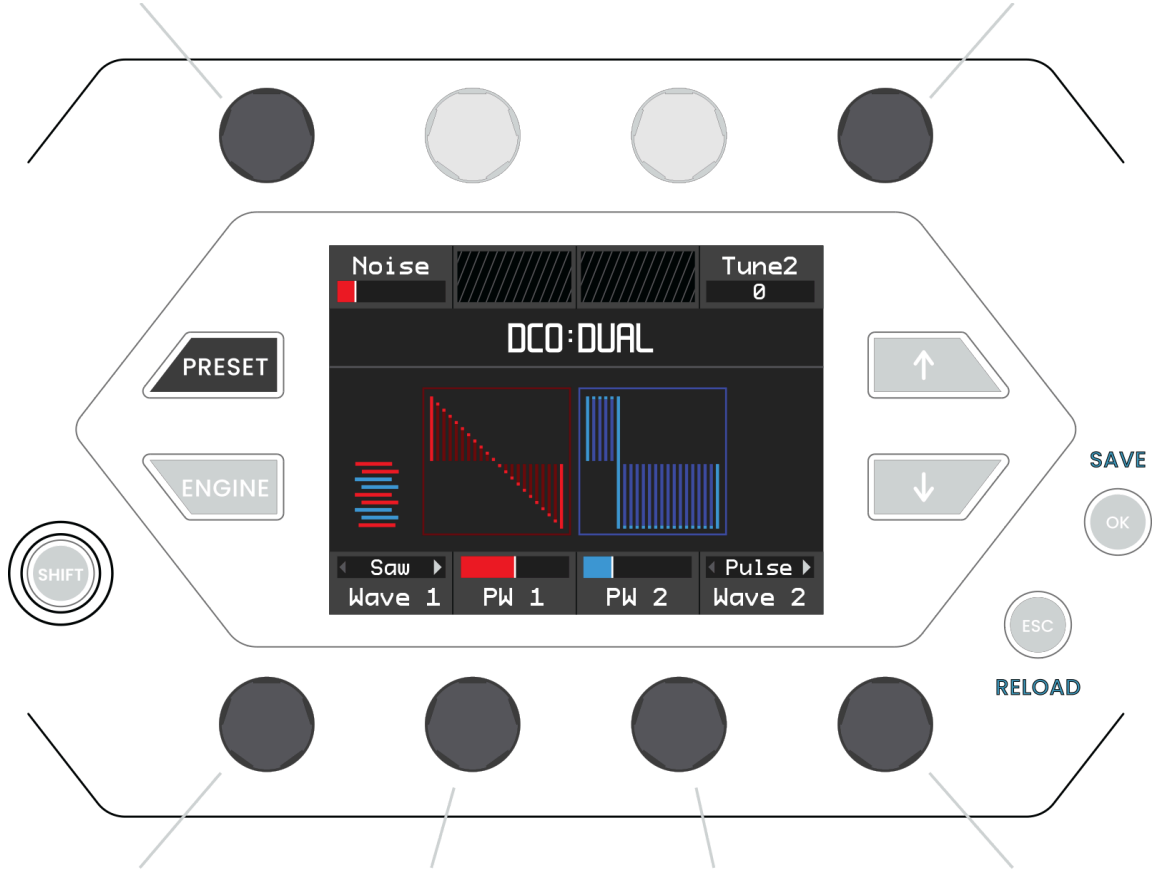
DCO: DUAL

The DCO: DUAL engine embodies the essence of the legendary analog polyphonic synthesizers. Two independently tunable oscillators give a wide sonic palette from lush pads and fat basses to screaming leads and beyond. Each oscillator provides a saw waveform and a square waveform with pulse width modulation.

Unlike most traditional synthesizers, the DCO: DUAL engine allows a single voice to stack up to 15 simultaneous waveforms. It also has a noise source that can be used to color the sound or to synthesize drum sounds.

‹Noise›
Noise Volume

‹Tune2›
Osc 2 tune



‹Wave 1›
Osc 1 Waveform

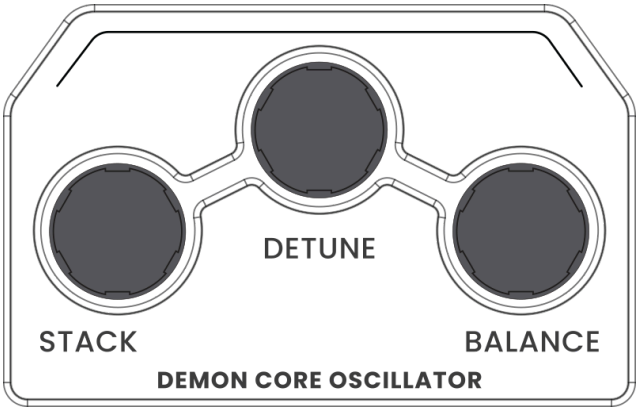
‹PW 1›
Osc 1 Pulse Width

‹PW 2›
Osc 2 Pulse Width

‹Wave 2›
Osc 2 Waveform

Parameter	Value	Description
‹WAVE 1›	SAW, PULSE, SAW R, PULSE R	OSC 1 Waveform
‹WAVE 2›	SAW, PULSE, SAW R, PULSE R	OSC 2 Waveform
‹PW 1›	0% … 100%	OSC 1 Pulse Width
‹PW 2›	0% … 100%	OSC 2 Pulse Width
‹NOISE›	0% … 100%	Noise Volume
‹TUNE 2›	-24st … +24st	OSC 2 tuning

- **[STACK]** knob controls the size of the oscillator stack.
- **[DETUNE]** knob controls the amount of detuning between the oscillators.
- **[BALANCE]** knob controls the amplitude of the OSC 1 and OSC 2.



Stack	← Detune →														
1								1	2						
2							2	1	2						
3						1	2	1	2	1					
4					2	1	2	1	2	1	2				
5				1	2	1	2	1	2	1	2	1			
6			2	1	2	1	2	1	2	1	2	1	2		
7		1	2	1	2	1	2	1	2	1	2	1	2	1	
8	2	1	2	1	2	1	2	1	2	1	2	1	2	1	2

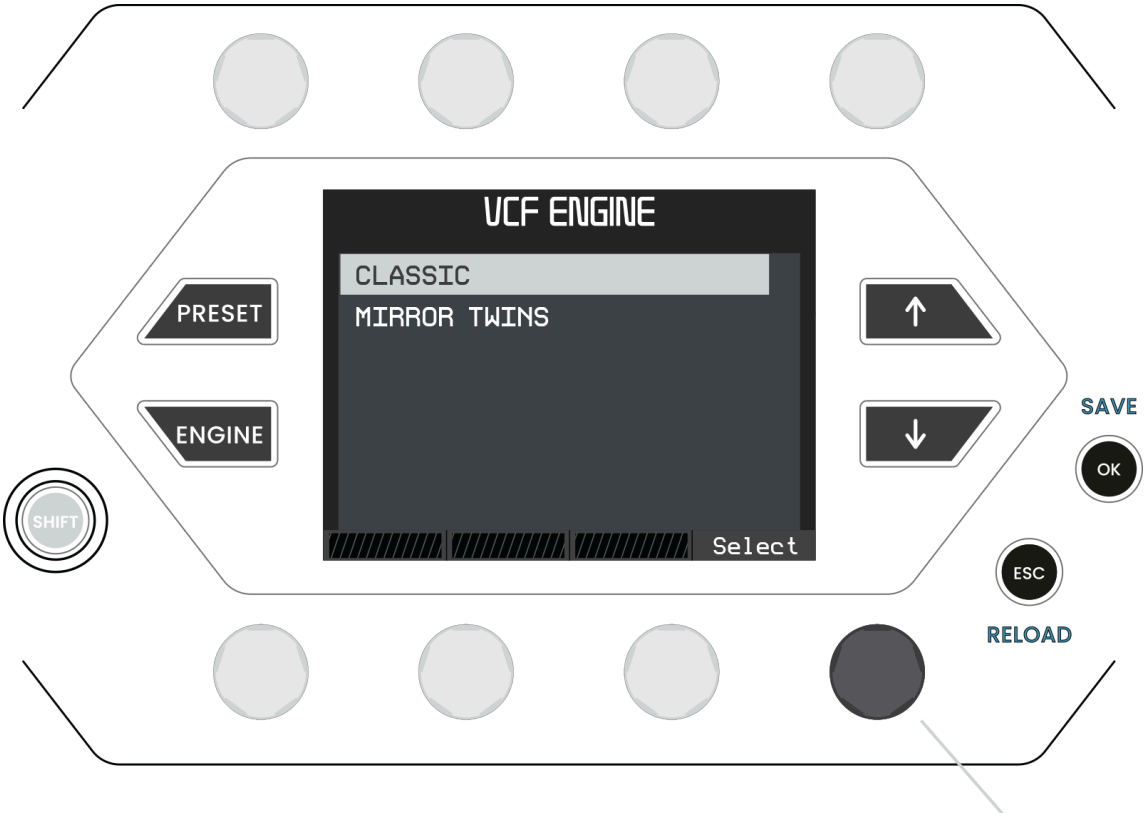
TIP: OSC 2 can be fine-tuned by holding the **[SHIFT]** button while turning the **<Tune2>** Soft Knob.

TIP: Pulse Width for the oscillators can be set to 25%, 50%, and 75% by holding down and turning the **<PW 1>** or **<PW 2>** Soft Knob.

NOTE: About SAW R and PULSE R waveforms: Each new note-on resets the waveform's initial phase. When detune is applied with a larger stack size, oscillators start in tune and then gradually drift, producing a flanging effect. This behavior is independent for Wave1 and Wave2.

VCF

The **VCF** (Voltage-Controlled Filter) is at the heart of the Redshift 6 sound—shaping tone, character, and movement with precision and musicality. Each voice features a fully analog filter section designed for warmth, dynamics, and responsiveness to both modulation and playing style.



‹Select›
Select engine

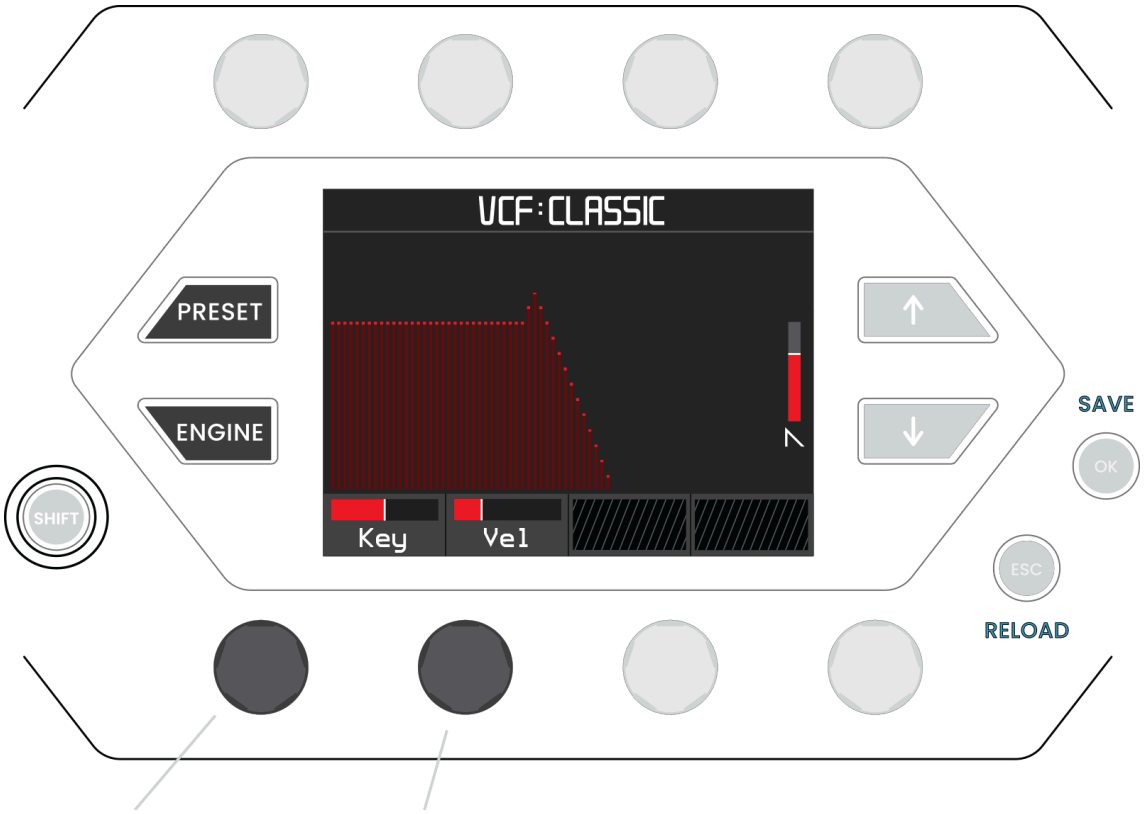
FX ENGINES:

Name	Description
CLASSIC	A multimode filter with classic characters.
MIRROR TWINS	Two pairs of a peak and a notch.

VCF: CLASSIC

The Classic VCF engine represents the core, traditional filter behaviors available in Redshift 6. It offers a wide range of tonal shaping, from gentle brightness adjustments to deep, resonant sweeps, with a continuously variable response that moves smoothly from classic low-pass filtering to more assertive, harmonically rich textures.

The Character control emphasizes these differences by reshaping the filter response through gain staging and related parameters, enhancing both subtle and dramatic settings. Drive integrates naturally into this behavior, reinforcing the filter's character without introducing hidden interactions—each control behaves exactly as expected, providing a direct filtering experience.

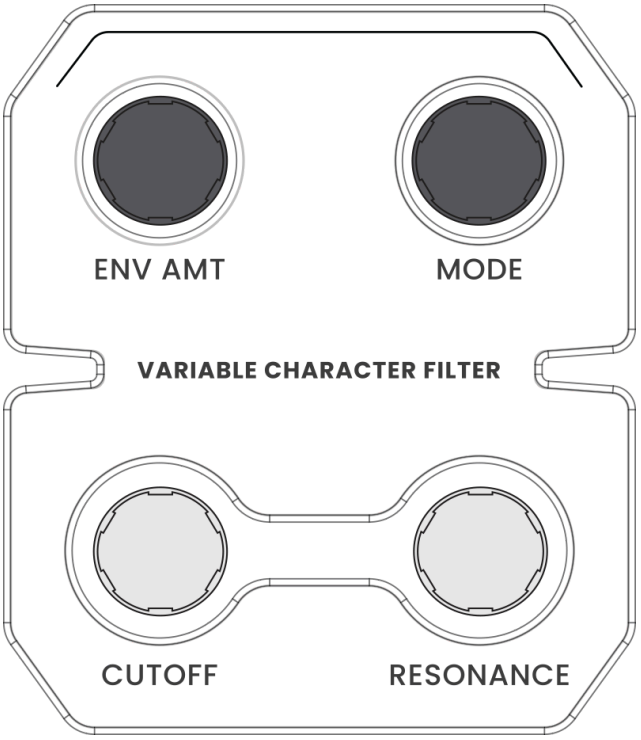


‹Key›
Key Follow

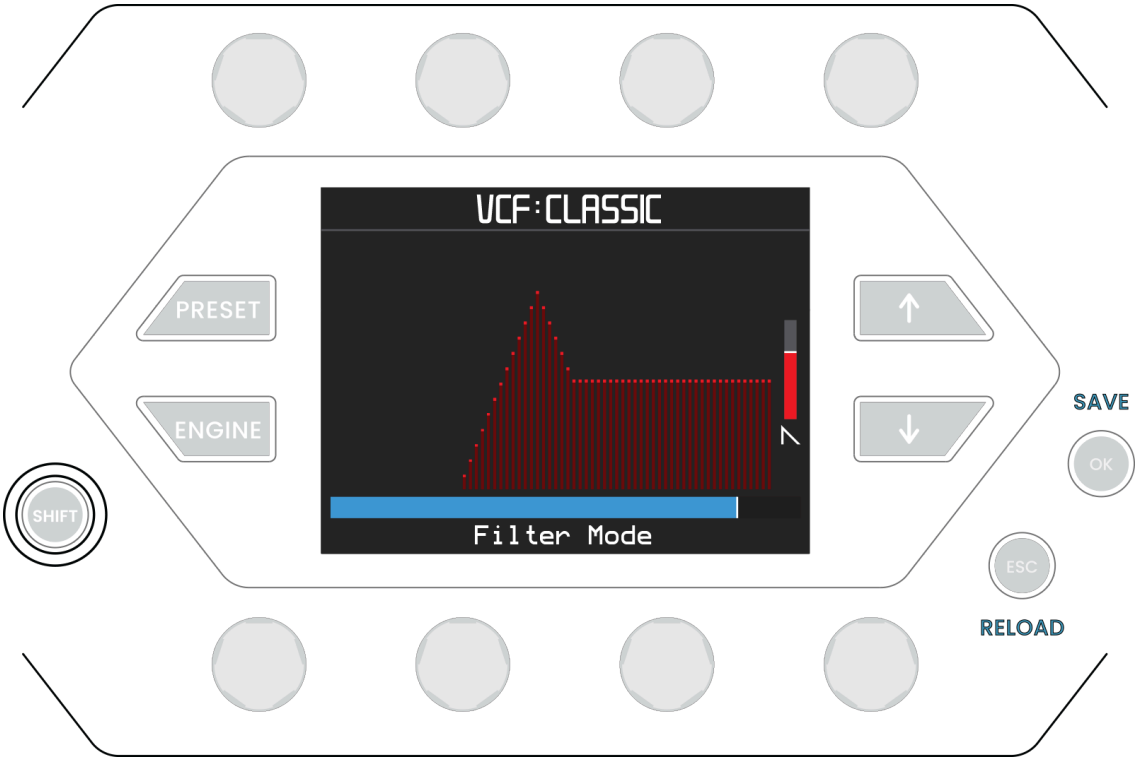
‹Vel›
Velocity >VCF ENV

Parameter	Value	Description
‹Key› Key Follow	0% … 100%	The amount to which the filter cutoff tracks the keyboard.
‹Vel› Velocity > VCF ENV	0% … 100%	The amount that the note-on velocity affects the strength of the **VCF ENV** modulation of the filter cutoff.
[ENV AMT] VCF ENV amount	-100% … +100%	The amount that the filter envelope **VCF ENV** affects the filter cutoff.

- **[CUTOFF]** knob controls the cutoff frequency of the filter.
- **[RESONANCE]** knob controls the amount of emphasis on a narrow band near the cutoff frequency.
- **[MODE]** knob interpolates between LPF … BPF … HPF modes.
- **[ENV AMT]** knob controls the intensity of the filter envelope **[VCF ENV]** modulating the cutoff.



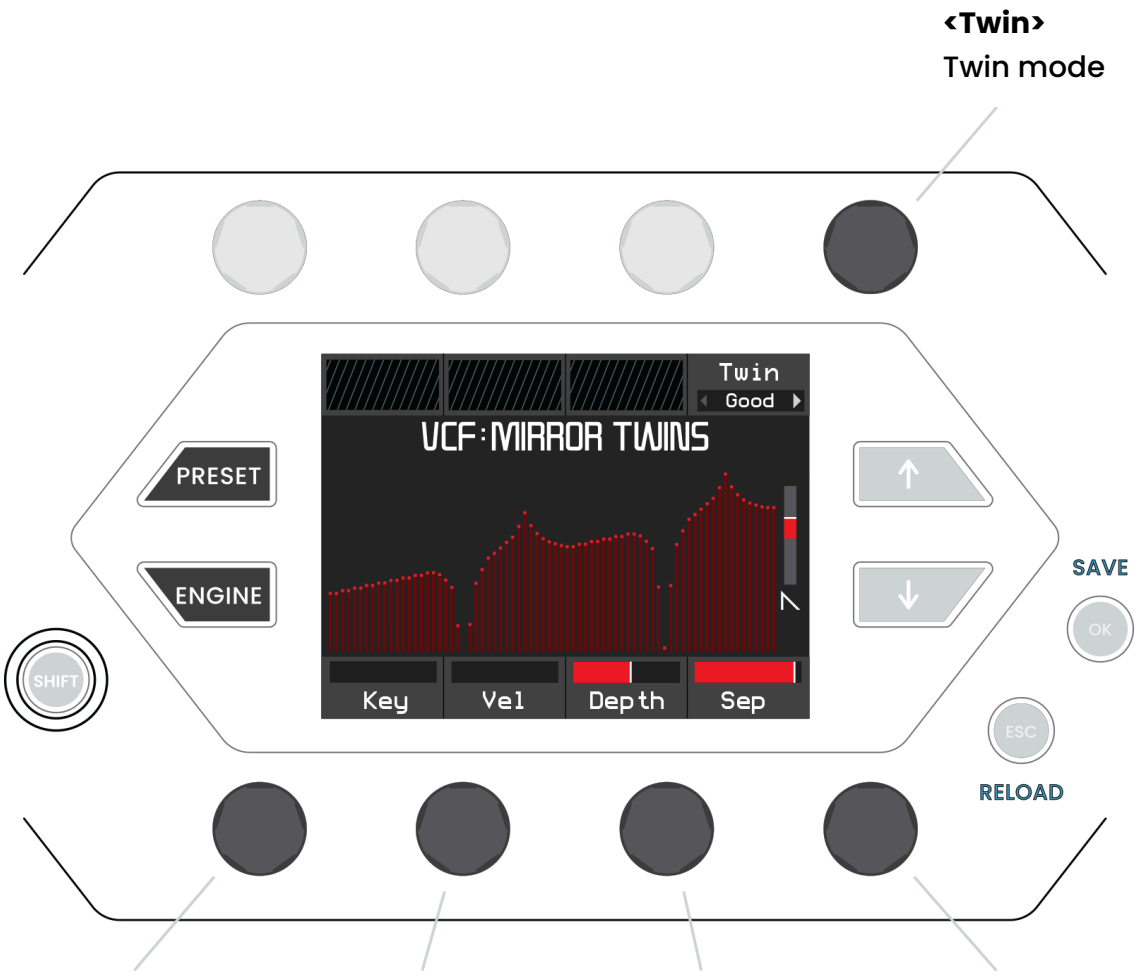
Filter Modes:



- **LPF – Low-Pass Filter –** Allows frequencies below a certain cutoff point to pass through while attenuating higher frequencies.
- **BPF – Band-Pass Filter –** Allows a specific band (range) of frequencies to pass through while attenuating both lower and higher frequencies outside of that band.
- **HPF – High-Pass Filter –** Allows frequencies above a certain cutoff point to pass through while attenuating lower frequencies.

VCF: MIRROR TWINS

Mirror Twins harnesses the analog core of the Variable Character Filter to give you two pairs of peak-notch structures to create anything from subtle stereo widening and phase interplay to pronounced dual-peak responses. The peaks and notches can shift, separate, or merge to form classic dual-notch shapes, low- or high-shelf responses, or more unusual mid-shelf contours.



‹Twin›
Twin mode

‹Key›
Key Follow

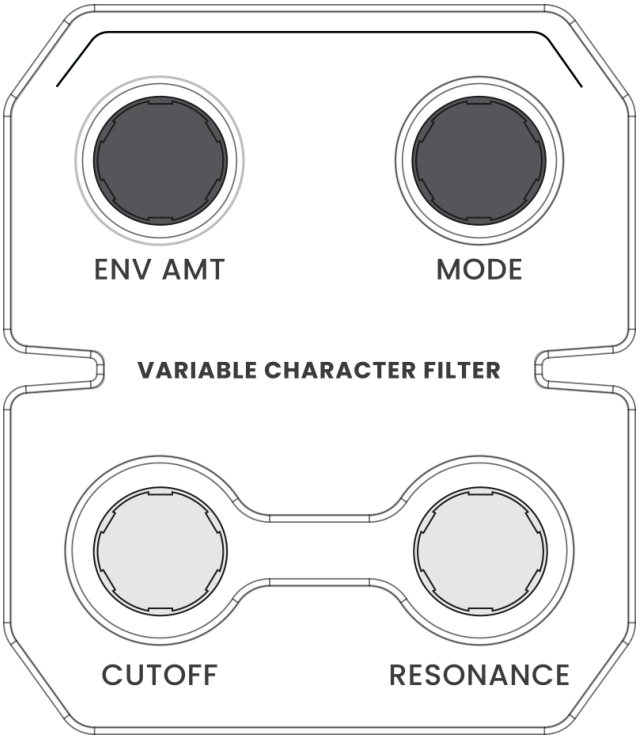
‹Vel›
Velocity >VCF ENV

‹Depth›
Notches depth

‹Sep›
Peaks separation

Parameter	Value	Description
‹Twin› Mode	Good, Evil	"Good" mode makes **[MODE]** knob function as a low or high shelf, and "Evil" mode changes the shape to an unusual middle-shelf.
‹Key› Key Follow	0% … 100%	The amount to which the filter cutoff tracks the keyboard.
‹Vel› Velocity > VCF ENV	0% … 100%	The amount that the note-on velocity affects the strength of the **VCF ENV** modulation of the filter cutoff.
‹Depth› Notches depth	0% … 100%	The depth of the two notches.
‹Sep› Peak separation	0% … 100%	The distance between the two peaks - notches pairs.
[ENV AMT] VCF ENV amount	-100% … +100%	The amount that the filter envelope **VCF ENV** affects the filter cutoff.

- **[CUTOFF]** knob controls the cutoff frequency of the filter.
- **[RESONANCE]** knob controls the depth of the peaks and the valleys.
- **[MODE]** knob controls the distance between the peak and notch.
- **[ENV AMT]** knob controls the intensity of the filter envelope **[VCF ENV]** modulating the cutoff.



NOTE:
Separating a peak from its notch with the **[MODE]** knob causes the filter to morph into a low or high shelf when the chosen **<Twin>** is “good”. Hence, the action of **[MODE]** is similar to that in the Classic VCF engine.

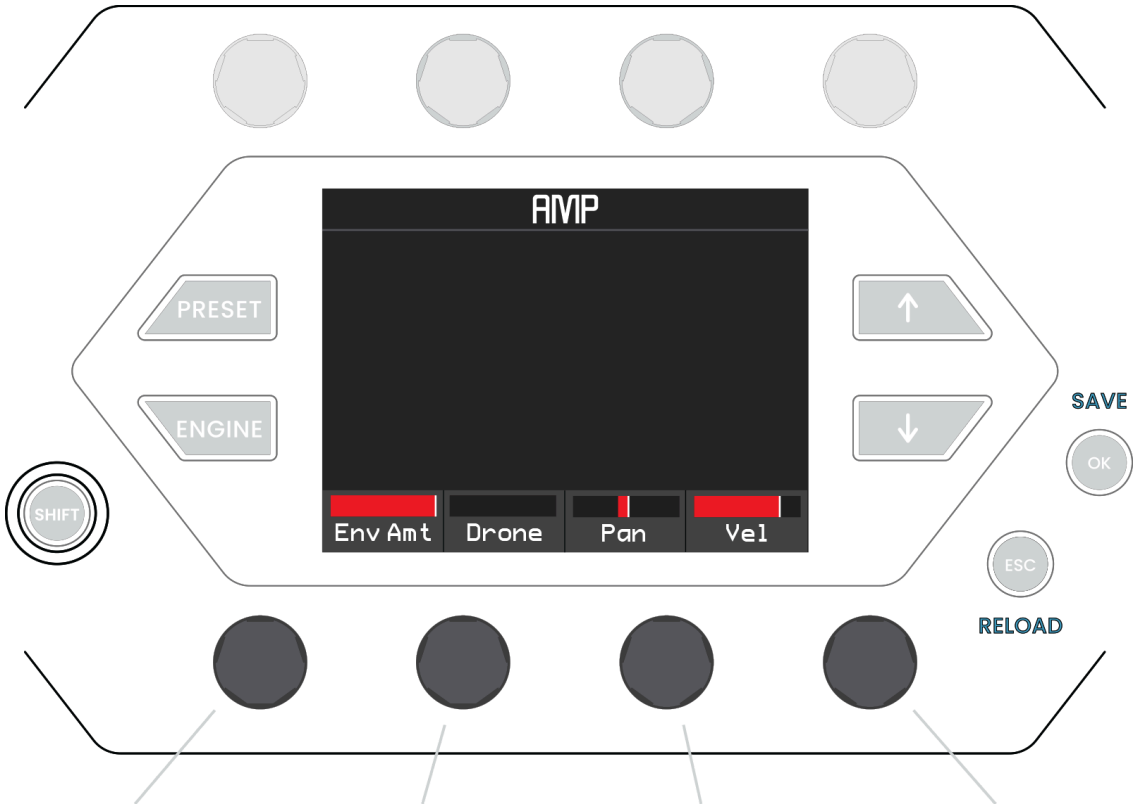
The "evil" **<twin>** goes the opposite way: the shape becomes an unusual middle-shelf, with the **[MODE]** knob controlling both the width and depth of the boost or cut at mid frequencies. When **[MODE]** is centered, the response is always a dual notch. **[RESONANCE]** knob affects the height of the peak, and when **[MODE]** is near its center setting, it also interacts with the width of the notch. When **[MODE]** is perfectly centered, the notch is precisely on top of the peak, eliminating it entirely, but **[RESONANCE]** knob continues to affect the width of the notch.

TIP: Some typical use cases for **VCF: MIRROR TWINS** are:

- **Four-pole phaser:**
  - Set **[MODE]** to center, **[CUTOFF]** near middle, **<Depth>** to max, adjust **<Sep>** to taste, and modulate **[CUTOFF]** with an **LFO** for that classic phaser sweep sound. Modulating two panned voices in opposite phase, using **<Unison>** at “2” and **<Spread>** at max on the **[PARTS]** page and **<Voice Alt>** as a **via** for the **LFO**, gives a wide stereo effect.
- **Leaky LPF / HPF:**
  - Choose the “good” **<Twin>**, set **<Depth>** to min, and **[MODE]** near its minimum for a steeply cutting high shelf. Increase **[MODE]** a little to let some of the high frequencies pass through for an LPF sound with added sparkle. Symmetrically, **[MODE]** near its maximum gives a steeply cutting low shelf with some low-end passing through for added body. **<Sep>** provides control over the width of the transition band. Adjust and modulate **[RESONANCE]** and **[CUTOFF]** to taste.
- **Smile or frown curve:**
  - Set **<Twin>** to “evil”, **<Depth>** to min, **[RESONANCE]** to min, **[MODE]** above its center position for a middle cut, **[CUTOFF]** near the middle. Adjust **<Sep>** and **[MODE]** to cut the desired amount of mids for a scooped mid smile curve. Turning **[MODE]** below its center setting produces the opposite mid-boosted frown curve. Increasing **[RESONANCE]** adds peaks at the edges of the cut area for dramatic sweeps.
- **Dual resonant LPF or HPF:**
  - Set **<Twin>** to “good”, **<Depth>** to min, **[MODE]** to min for LPF or max for HPF, increase **[RESONANCE]**, and adjust <Separation> by ear. Modulate **[CUTOFF]** or **<Sep>** for various resonance sweeps.

AMP

The amplitude-related parameters, like volume, gain, stereo pan, and key velocity can be adjusted here. The AMP is always affected by the **[AMP ENV]**, even though this connection isn't visible in the **[MOD MATRIX]**.



‹Env Amt›
AMP env amount

‹Drone›
Drone-mode

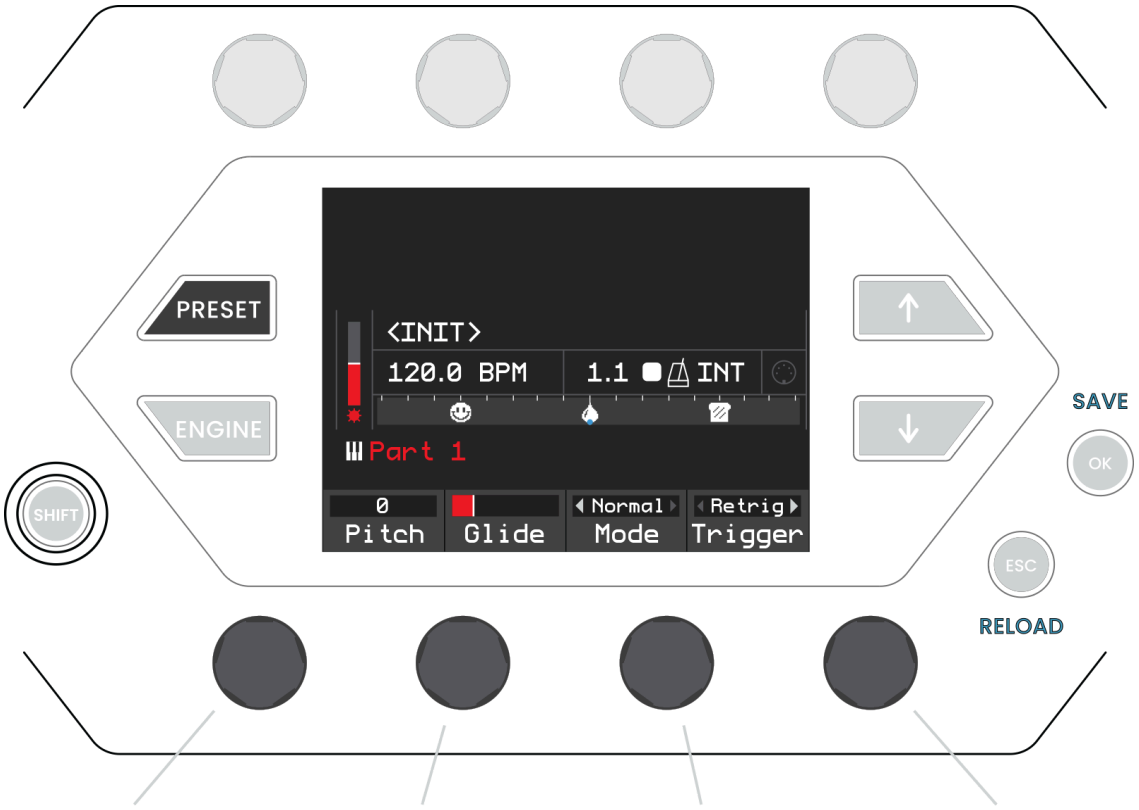
‹Pan›
Stereo Pan

‹Vel›
Velocity›AMP

Parameter	Value	Description
‹Env Amt› AMP env amount	0% … 100%	AMP envelope amount.
‹Drone› Drone-mode	0% … 100%	“Drone-mode”, which opens the AMP (VCA offset).
‹Pan› Stereo Pan	-100% … +100%	Sets the stereo position.
‹Vel› Velocity › AMP	0% … 100%	Sets the level how much Velocity affects the amplitude.

PERFORM

Perform page displays performance parameters, including the Preset name, the currently selected Part/Group, Character, Drive amount, Tempo, Clock Sync status (Internal or MIDI), and the Trigger Mode, which determines whether envelopes are retriggered during legato playing. It also provides real-time feedback on all incoming MIDI messages and shows the current pitch and glide values and modes for the selected part.



‹Pitch›
Pitch of the selected part

‹Glide›
Amount of Glide (Portamento)

‹Mode›
Glide Mode

‹Trigger›
Trigger mode for envelopes

Parameter	Value	Description
‹Pitch›	-24 st … + 24 st	Pitch of the selected part
‹Glide›	0% … 100%	Amount of Glide (Portamento)
‹Mode›	Normal / Legato	Sets the Glide affecting every note (=Normal), or only while playing legato.
‹Trigger›	Retrig / Legato	Envelope trigger mode

NOTE:
The **‹Glide›** parameter is per part and is also available with paraphonic sounds. Voice allocation continues in its standard round-robin order, regardless of whether you play legato or in normal mode.

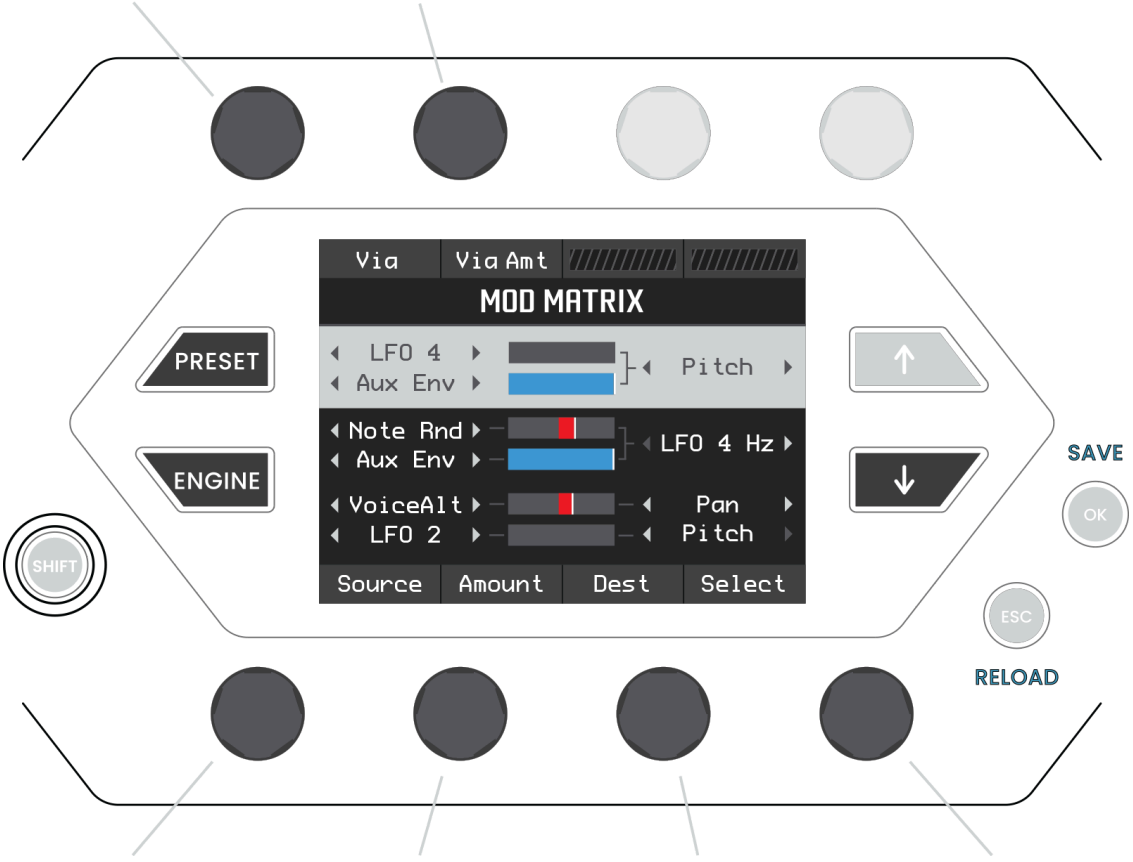
MOD MATRIX

MOD MATRIX lists all the assigned modulations and makes controlling complex modulations simple. Besides showing the assigned modulations, the MOD MATRIX can also be used to set new modulation sources and targets.

Modulations can be combined using **‹Via›**, which sends the selected modulation source through the selected **‹Via›** modulation source.

‹Via›
Via modulation source

‹Via Amt›
Amount of the Via modulation



‹Source›
Source of the modulation

‹Amount›
Amount of the modulation

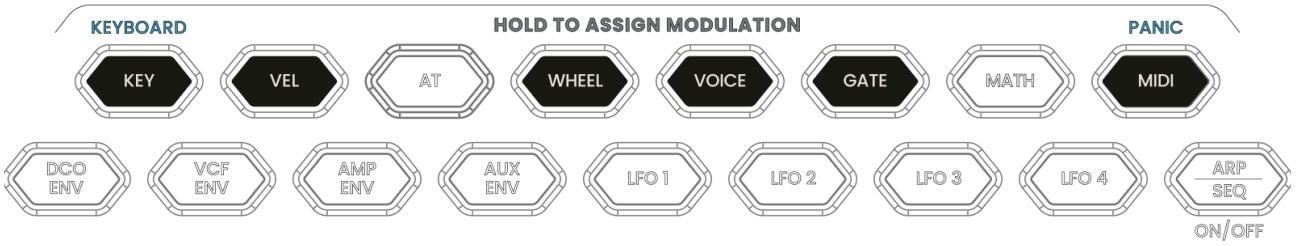
‹Dest›
Destination of the modulation

‹Select›
Select the modulation slot for editing

TIP: Hold the **[SHIFT]** button and press the parameters **knob** or **Soft Knob** to reset the parameter to its default value. Turning the parameter **Soft Knob** while holding down the **[SHIFT]** button enables fine-tuning mode. Holding down the **Soft Knob** while turning sets the edited parameters value to -100% / 0% / +100%.

Modulation Grid

The Modulation Grid provides access to modulation sources and their parameters and is used to assign modulation.



Bottom Row:

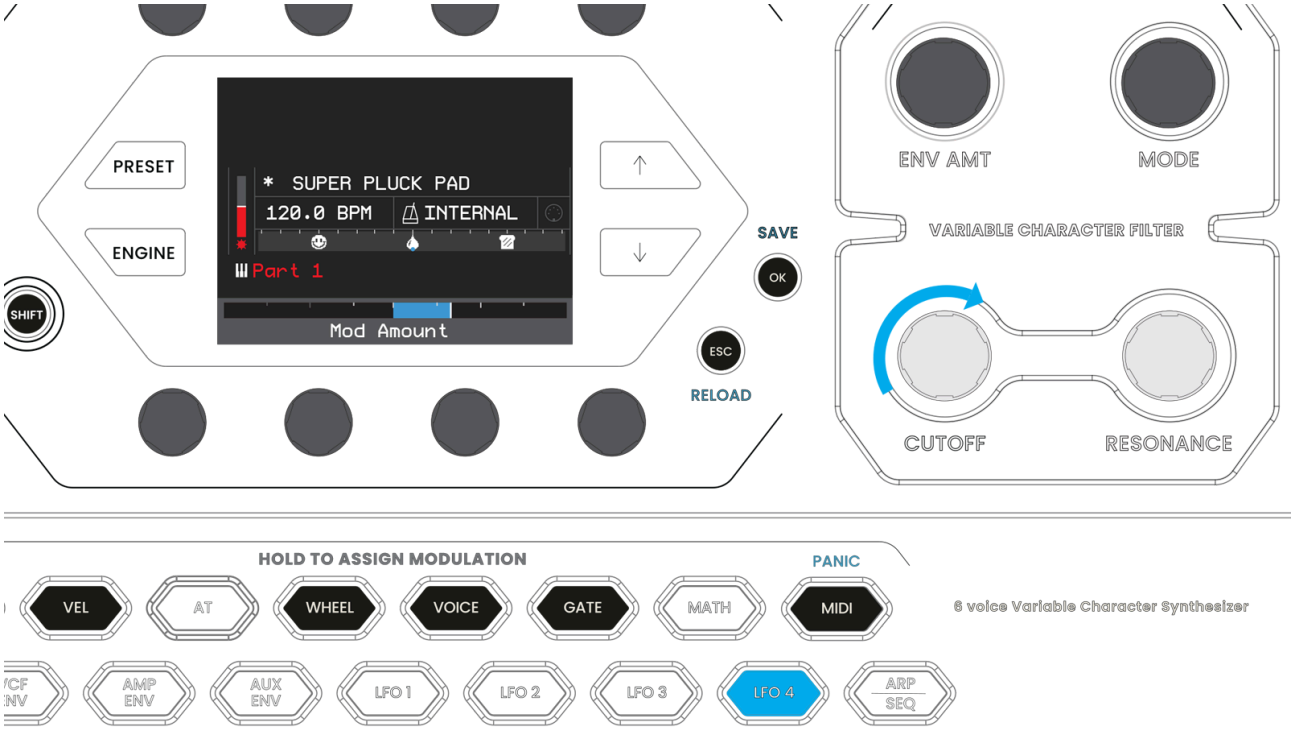
- The **[DCO ENV]** button assigns the DCO envelope as a modulation source.
- The **[VCF ENV]** button assigns the VCF envelope as a modulation source.
- The **[AMP ENV]** button assigns the AMP envelope as a modulation source.
- The **[AUX ENV]** button assigns the auxiliary envelope as a modulation source.
- The **[LFO1], [LFO2], [LFO3],** and **[LFO4]** buttons assign LFO1-4 as a modulation source.
- The **[ARP|SEQ]** button shows the arpeggiator or sequencer parameters.

Top Row:

- The **[KEY]** button assigns the MIDI note key as a modulation source.
- The **[VEL]** button assigns note velocity as a modulation source.
- The **[AT]** button assigns aftertouch as a modulation source.
- The **[WHEEL]** button assigns the Modulation Wheel as a modulation source.
- The **[VOICE]** button assigns Redshift 6's voice number as a modulation source.
- The **[GATE]** button assigns the MIDI note-on/off as a modulation source.
- The **[MATH]** button is not yet implemented.
- The **[MIDI]** button assigns the MPE Timbre (CC74) as a modulation source.

Assigning Modulations

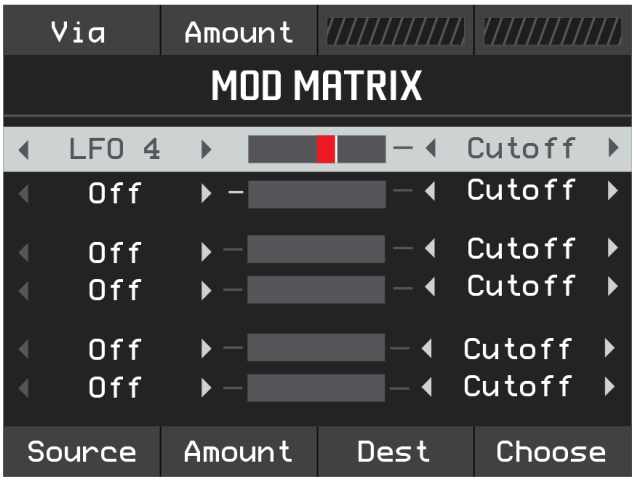
While it is possible to add all the needed modulations directly from the **[MOD MATRIX]** page, the modulations can also be quick-assigned and adjusted by holding a modulation source button and turning a knob controlling a modulation target parameter.



For example, holding the **[LFO 4]** button while turning the **[CUTOFF]** knob will assign **LFO 4** to modulate the filter **Cutoff**.

Assigned modulations can be edited in detail by pressing the **[MOD MATRIX]** button.

Hold the **[SHIFT]** button while pressing the assigned modulation parameter **knob** or **Soft Knob** to reset its value.



Modulation Source Lock

Quick-assigning modulations can require finger dexterity and complex two-handed combinations, especially if Via's are used. Modulation Source Lock mode makes adding modulations easier.

- Double-click the modulation source button to activate Mod Source Lock mode. The modulation source LED will blink.
- Locate the page with the parameter used as a modulation destination.
- Turn a Soft Knob to assign modulation.
- Exit the Modulation Source Lock mode by pressing the selected modulation source again, or with the **[ESC]** button.

Adding a Via

Via's can be added to control the modulation intensity with another modulation source. A common usage of Via's is the Mod Wheel controlling the amount of LFO modulation DCO Pitch, where the intensity of the vibrato effect is related to the position/value of the Mod Wheel.

- Hold two modulation buttons while turning a **knob** will assign a modulation with a **Via**.
- To access the Modulation Source Lock mode, double-click both modulation source buttons simultaneously, or hold one modulation source button and double-click the other one.

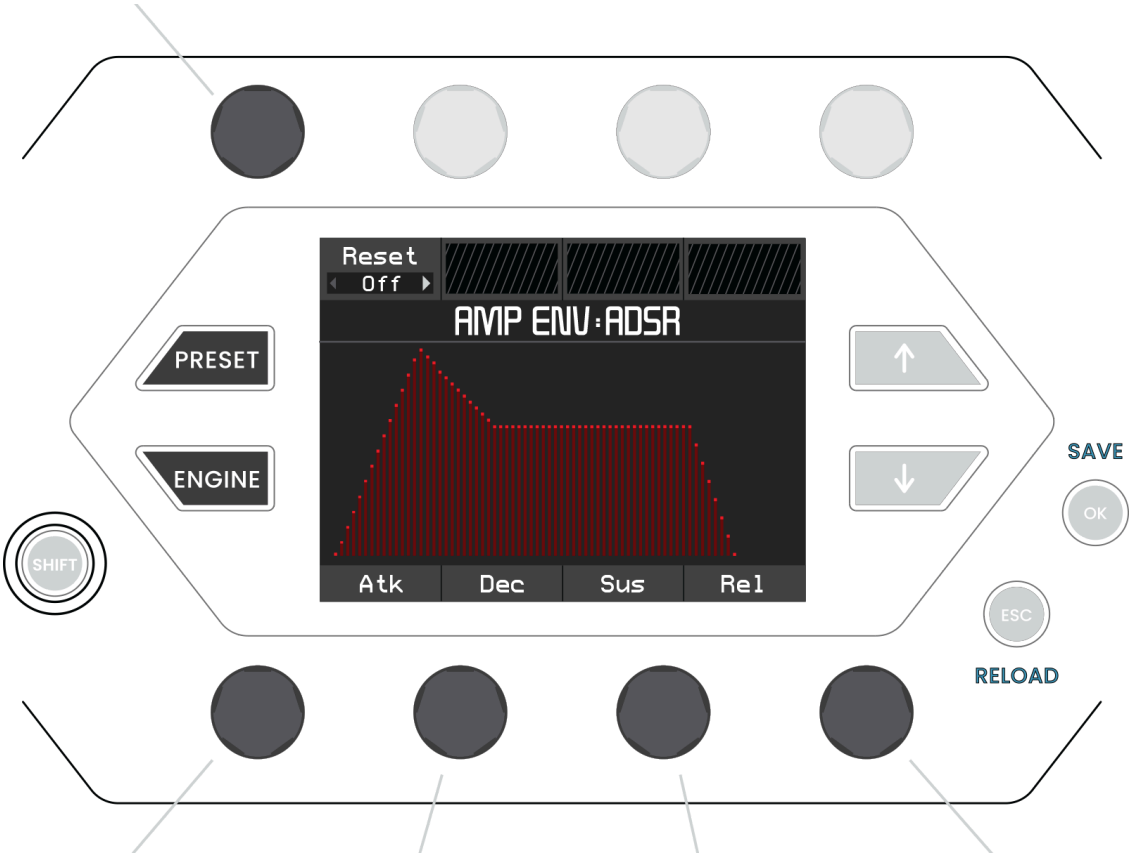
TIP:
Press the assigned modulation destination **knob** or **Soft Knob** to show the parameter value without a need to change the value.

NOTE:
If the modulation source button has multiple sources available, use the arrow **[↑] [↓]** buttons (while holding the mod source button) to switch between them. All modulation sources can only be accessed via **[MOD MATRIX] <Source>** -list. Refer to the modulation source and destination for the complete list.

ENV

Redshift 6 has four envelopes: **[DCO ENV]**, **[VCF ENV]**, **[AMP ENV]**, and **[AUX ENV]**, that control how the sound changes over time. They are typically used to shape the pitch, timbre, amplitude, or other aspects of the sounds.

‹Reset›
Env Reset



‹Atk›
Attack time

‹Dec›
Decay time

‹Sus›
Sustain level

‹Rel›
Release time

Parameter	Value	Description
<Atk> Attack Time	1ms … 60sec	Sets the duration for the envelope to move from its initial minimum to maximum level.
<Dec> Decay time	1ms … 60sec	Sets the duration for the envelope to move from the maximum level to the sustain level after the attack stage.
<Sus> Sustain level	0% … +100%	The level the envelope holds while the key is held down.
<Rel> Release time	1ms … 60sec	The time it takes for the envelope to fade out to its initial minimum level.
<Reset> ENV reset	Off, On	When On, each note-on MIDI message resets the ENV to its minimum value. When Off, the envelope's attack phase begins from its current level.

Each envelope can be used as a modulation source for any modulation destination, and is shown in the **MOD MATRIX**, with the following exceptions:

- The **[AMP ENV]** functions as a modulation source for the **[AMP]** with full modulation amount.
- The **[VCF ENV]** functions as a modulation source for the filter **[CUTOFF]** with the **[ENV AMT]** knob controlling the modulation amount.
- The **[DCO ENV]** functions as a modulation source for the individual paraphonic oscillators amplitude with full modulation amount while **<para>** is set to 2 … 16.

  These modulations are always set and are not shown in the **[MOD MATRIX]**.

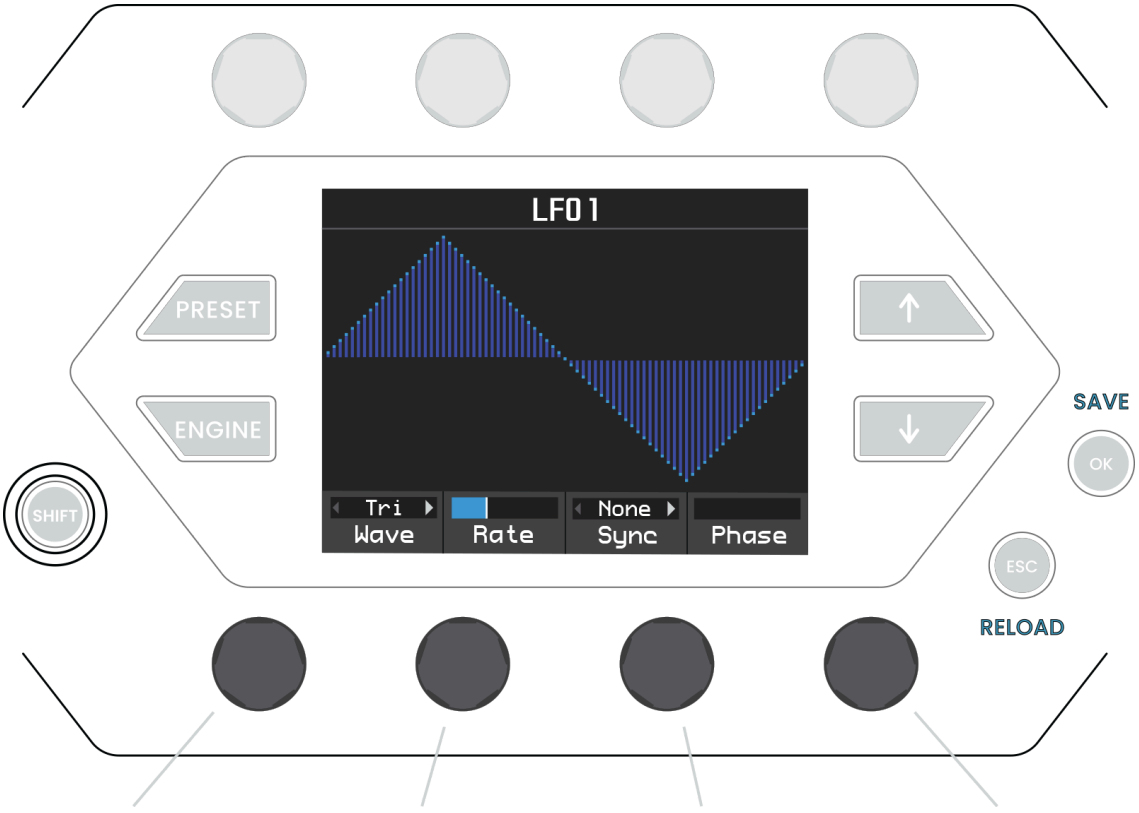
The envelope is initiated when a MIDI note-on message is received. After the **<Attack>** and **<Decay>** stages, the envelope is held at the **<Sustain>** level until a midi note-off message is received, which starts the **<Release>** state. If a new MIDI note-on message is received while the last **<Release>** stage is not fully completed, and the **<Reset>** parameter is "Off" the envelope will continue to the Attack stage from its current level. If the **<Reset>** is "On", the envelope will always start its **<Attack>** stage at zero (minimum) level.

Practical ideas for ENV modulations:

- Filter Cutoff modulation - The **VCF ENV** modulates the **<Cutoff>** frequency to create a filter sweep.
    - Adjust **[VCF ENV]** **<Atk>**, **<Dec>**, **<Rel>** parameters to your liking, add a relatively low **<Sus>** level, and turn **[ENV AMT]** Knob for adjusting the modulation amount.
    - If needed, turn **[CUTOFF]** counterclockwise to hear the effect. Boost the effect with **[RESONANCE]**
- Pitch modulation - The **ENV** modulates the **<Tune2>** of the **[DCO]** to create a “Blip” for a synth brass.
    - Adjust **[AUX ENV]** to have immediate **<Atk>** and **<Rel>**, relatively fast **<Dec>**, and minimum **<Sus>** level.
    - Hold **[AUX ENV]**, press **[DCO]**, and turn **<Tune2>** Soft Knob for adjusting the modulation amount. Fine-tune in **MOD MATRIX**.

LFO

Redshift 6 has 4 LFOs, Low-Frequency Oscillators: **[LFO 1]**, **[LFO 2]**, **[LFO 3]**, and **[LFO 4]**, that control how the sound changes over time. They are typically used to shape the pitch, timbre, amplitude, or other aspects of the sounds.



‹Wave›
LFO waveform

‹Rate›
LFO rate

‹Trigger›
LFO trigger source

‹Phase›
LFO phase

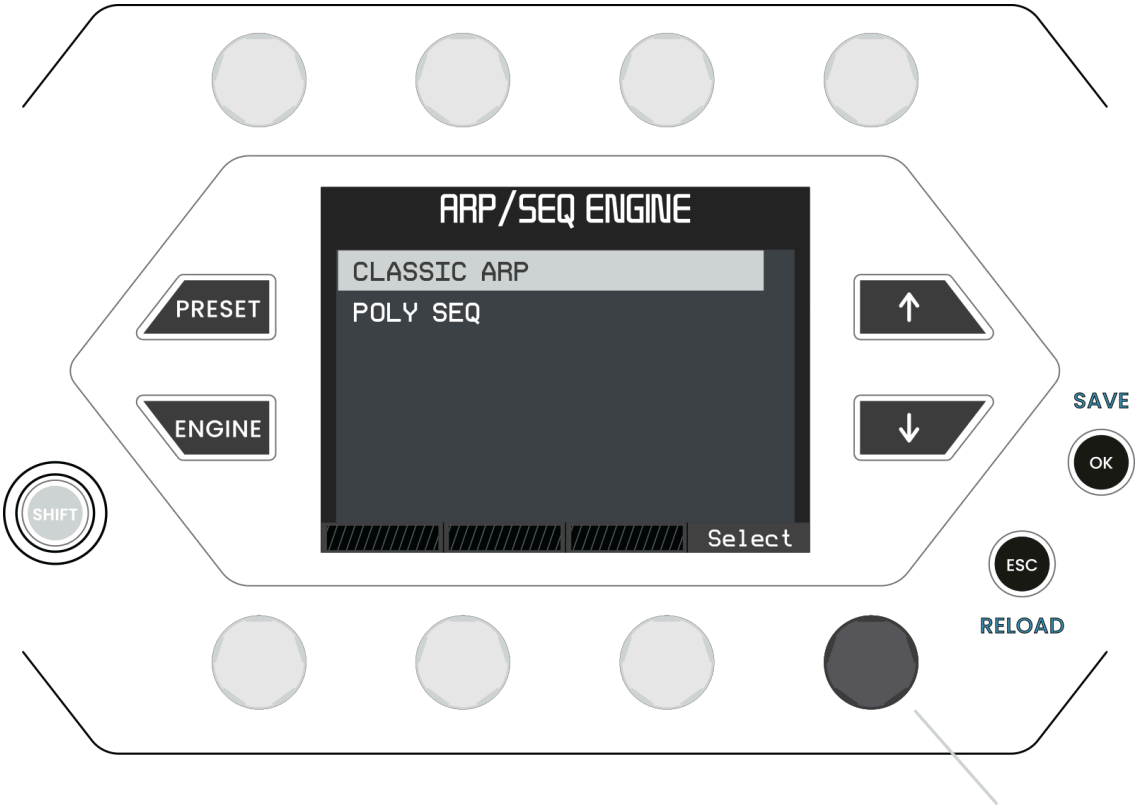
PARAMETER	VALUE	Description
‹Wave› LFO waveform	Tri Sqr Sin Saw RevSaw Exp RevExp Log RevLog S&H	Triangle Wave (bipolar) Square Wave (bipolar) Sine Wave (bipolar) Saw Wave (bipolar) Reverse Saw (unipolar) Exponential Curve (unipolar) Reverse Exponential Curve (unipolar) Logarithmic Curve (unipolar) Reverse Logarithmic Curve (unipolar) Sample and Hold, "Random value" (bipolar)
‹Rate› LFO rate	10s … 100 Hz	LFO frequency. If Sync = Clock, divisions.
‹Sync› LFO trigger source	None NoteOn NoteOff LFO1 LFO2 LFO3 LFO4 Clock	Free running Midi note-on retriggers the LFO Released note retriggers the LFO LFO1's complete cycle retriggers the LFO LFO2's complete cycle retriggers the LFO LFO3's complete cycle retriggers the LFO LFO4's complete cycle retriggers the LFO LFO is tempo-synced to the master clock
‹Phase› LFO phase	0 … 360 deg	LFO waveform phase

Practical ideas for LFO modulations:

- Pitch modulation - The **LFO** modulates the **<Pitch>** of a sound to create a Vibrato effect.
    - Hold **[LFO 1]**, press **[PERFORM]**, and turn **<Pitch>** Soft Knob for adjusting the modulation amount.
- Amplitude modulation - The **LFO** modulates the **<Volume>** to create a Tremolo effect.
    - Hold **[LFO 1]**, press **[AMP]**, and turn **<Volume>** Soft Knob for adjusting the modulation amount.
- Filter Cutoff modulation - The **LFO** modulates the **<Cutoff>** frequency to create a sweeping “wah-wah” effect.
    - Hold **[LFO 1]**, and turn the **[CUTOFF]** knob for adjusting the modulation amount.
- Adding movement and texture: Subtle LFO modulations can be used to introduce slight variations in pitch, volume, or timbre, adding a sense of movement and richness to the sound.
    - Hold **[LFO 1]**, press **[DCO]**, and turn **<Tune2>** Soft Knob slightly for adjusting the modulation amount. Hold **[SHIFT]** for fine-tuning.
- Modulating panning: The LFO can control the stereo position of a sound, creating a panning effect where the sound moves back and forth between the left and right speakers.
    - Hold **[LFO 1]**, press **[AMP]**, and turn **<Pan>** Soft Knob for adjusting the modulation amount.

ARP | SEQ

ARP SEQ has two engines: a classic arpeggiator and a polyphonic step sequencer.



‹Select›
Select engine

ARP|SEQ ENGINES:

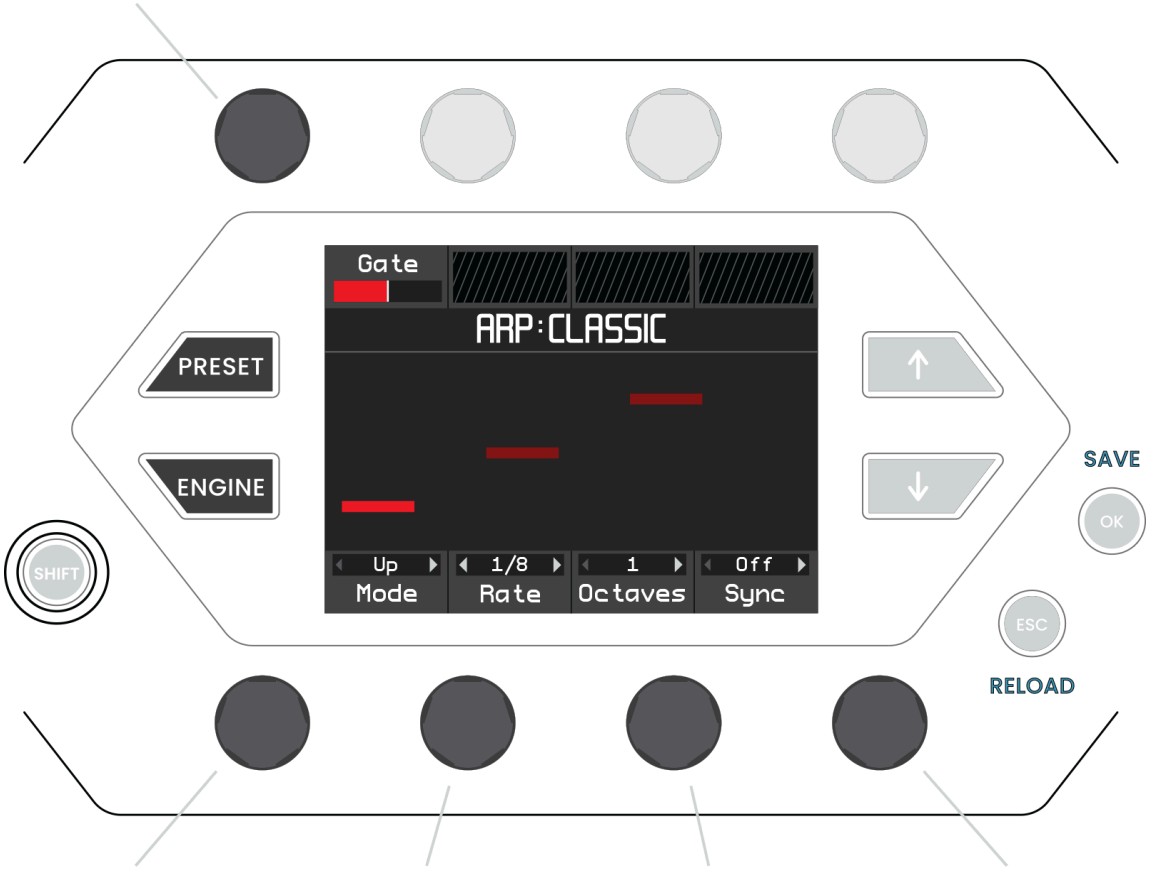
Name	Description
ARP: CLASSIC	A classic arpeggiator.
SEQ: POLY	Polyphonic 32-step sequencer.

ARP: CLASSIC

The Arpeggiator turns held notes into rhythmic patterns, cycling through them by method and tempo instead of playing them all at once. On the Redshift 6, it can sync to the internal clock or external MIDI and offers playback modes (up, down, up/down, random, etc.). Adjustable rate, octave range, and gate length let you shape anything from simple backing to complex evolving sequences.

Press **[SHIFT] + [ARP]** (or double tap the **[ARP]** button) to toggle the arpeggiator on or off.

‹Gate›
Note length



‹Mode›
ARP Note order

‹Rate›
ARP divisions

‹Octaves›
ARP range

‹Sync›
ARP starting point

NOTE: Each Part has its own independent arpeggiator.

Parameter	Value	Description
‹Gate› Note Length	0% … 50% … 100%	Sets the note length (Gate) for all ARP notes.
‹Mode› Note order	Up Down UpDown UpDown2 Played Random	Sets how the ARP sorts the order of the notes.
‹Rate› Note division	8/1 … 1/4 … 1/64	Sets the rate / division.
‹Octaves› ARP range	1, 2, 3, 4	Sets the range of octaves.
‹Sync› ARP starting point	Note, Clock	If set to Note, the ARP starts immediately, synced to the first MIDI note-on. When set to Clock, it begins on the next clock division.

TIP: ARP can also be used as a modulation source.

Practical ideas for ARP modulations:

- **Driving Basslines** – The Arpeggiator cycles root notes to create energetic basslines.
    - Set **‹Mode›** to “Up”, hold a single note, and adjust **‹octaves›** for extended range.
- **Chord Rhythms** – Sustained chords become rhythmic textures.
    - Set **‹Mode›** to “Played” and play triads to generate pulsing chord patterns.

SEQ: POLY

The SEQ: POLY sequencer engine combines classic step sequencing with full polyphonic capability, supporting up to 32 steps per pattern. Each step can contain up to six notes, allowing for the creation of chords and harmonic progressions within a single sequence.

Playback is synchronized to the internal clock or external MIDI clock, with adjustable step division. A selection of chord types and inversions enables the fast programming of complex harmonies.

Each step includes expressive parameters such as velocity (available as a modulation source), CV modulation values, gate length, and optional glide between steps. For each step, the notes can be entered step-by-step using an external MIDI controller or the internal keyboard.

The sequencer runs independently per part in a multi-timbral patch, allowing multiple sequences with different settings to play simultaneously.

Page navigation

The **SEQ: POLY** engine is divided into 3 pages:

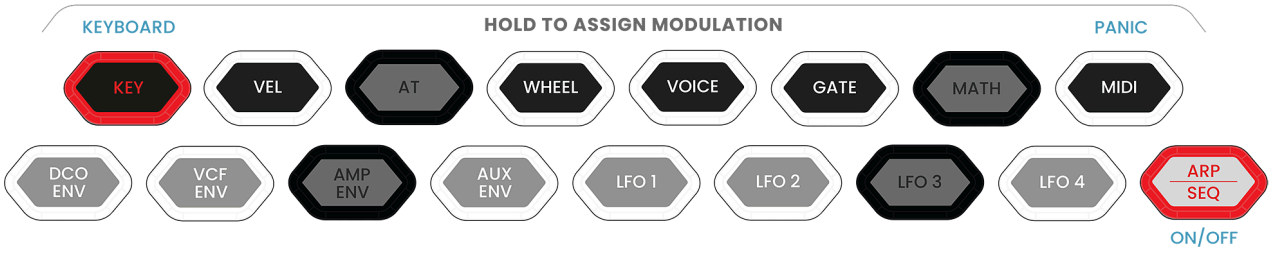
- **MAIN**
- **STEP**
- **NOTES**

Press the **[ARP|SEQ]** button to access the main page.

Pressing the modulation source buttons selects the step for editing. When the sequence is more than 16 steps long, use the arrow **[↑] [↓]** buttons to switch between steps 1-16 and 17-32. Pressing the same step button (=Modulation grid) again switches between Step and Notes pages.

Step buttons

The two rows of the modulation grid act as step selectors for steps 1–16 (left to right). For sequences longer than 16 steps, use the arrow keys to access steps 17–32. The **[ARP|SEQ]** button always brings up the Main page.



Step LED indications

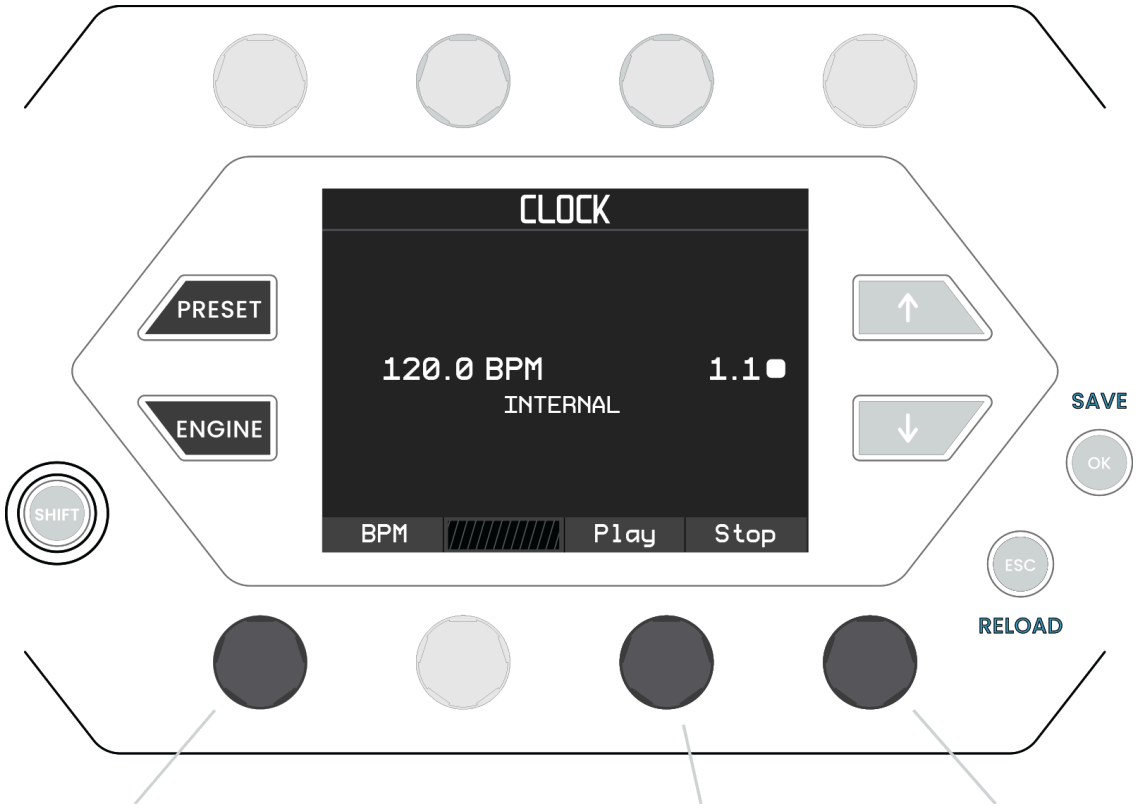
The step button LEDs in the Modulation Grid indicate the status of steps 1–16, or 17–32 when the sequence exceeds 16 steps, using the following distinct visual cues:

	LED fully off	Step unselected, disabled
	LED breathing (part color)	Step selected
	LED ON (white color)	Step unselected, enabled
	LED blinking (part color)	Step currently playing (sequence playhead position)

TIP: Multi-editing steps is available by holding the first step and pressing other steps and adjusting parameters.

Global Transport Control

The transport controls - **Play/Pause** and **Stop** - can be accessed from the **‹CLOCK›** page. These controls operate globally: when multiple parts contain sequences, all sequencers will start and stop together. To disable a sequence for an individual part, select the desired part and press **[SHIFT] + [ARP|SEQ]**.



‹BPM›
Tempo adjust

‹Play/Pause›
Transport control

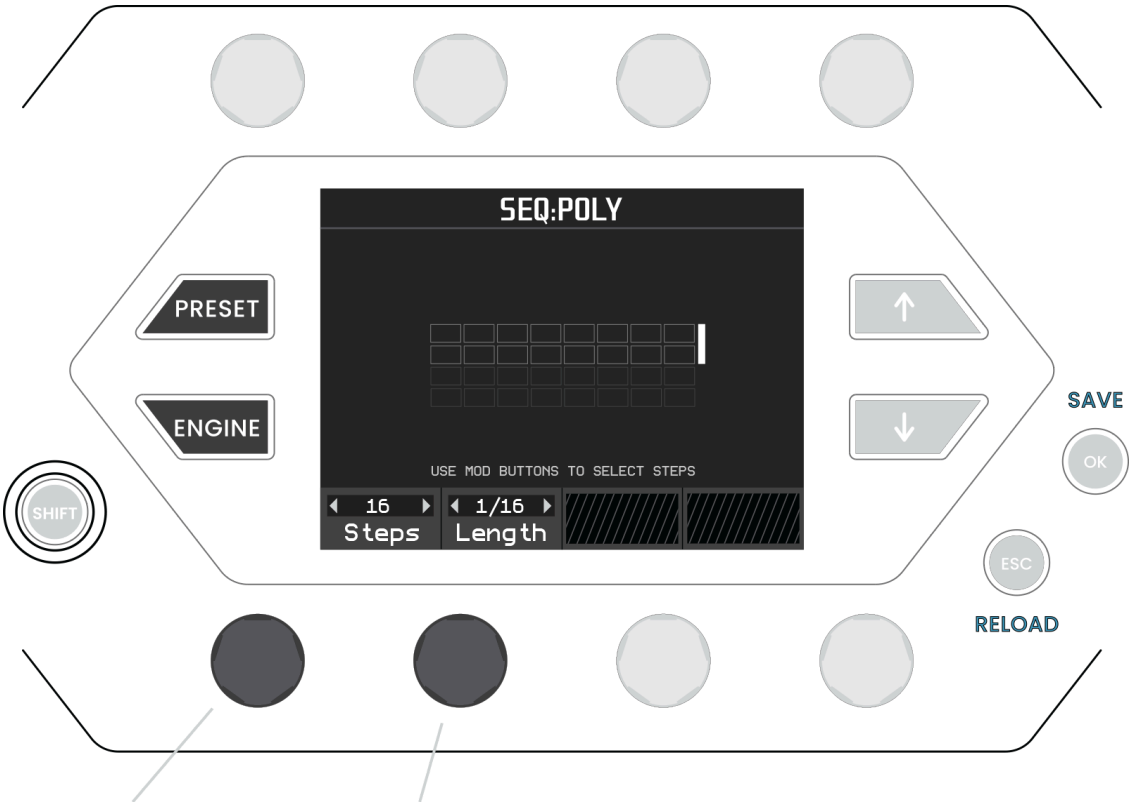
‹Stop›
Transport control

TIP: The Transport controls can be accessed from any page by pressing:

- **‹CLOCK› + ‹OK›** for Play/Pause
- **‹CLOCK› + ‹ESC›** for Stop.

MAIN:

The MAIN page displays the global settings for the selected part's sequencer, including the total number of steps and the step length as a division of the internal or external MIDI clock.



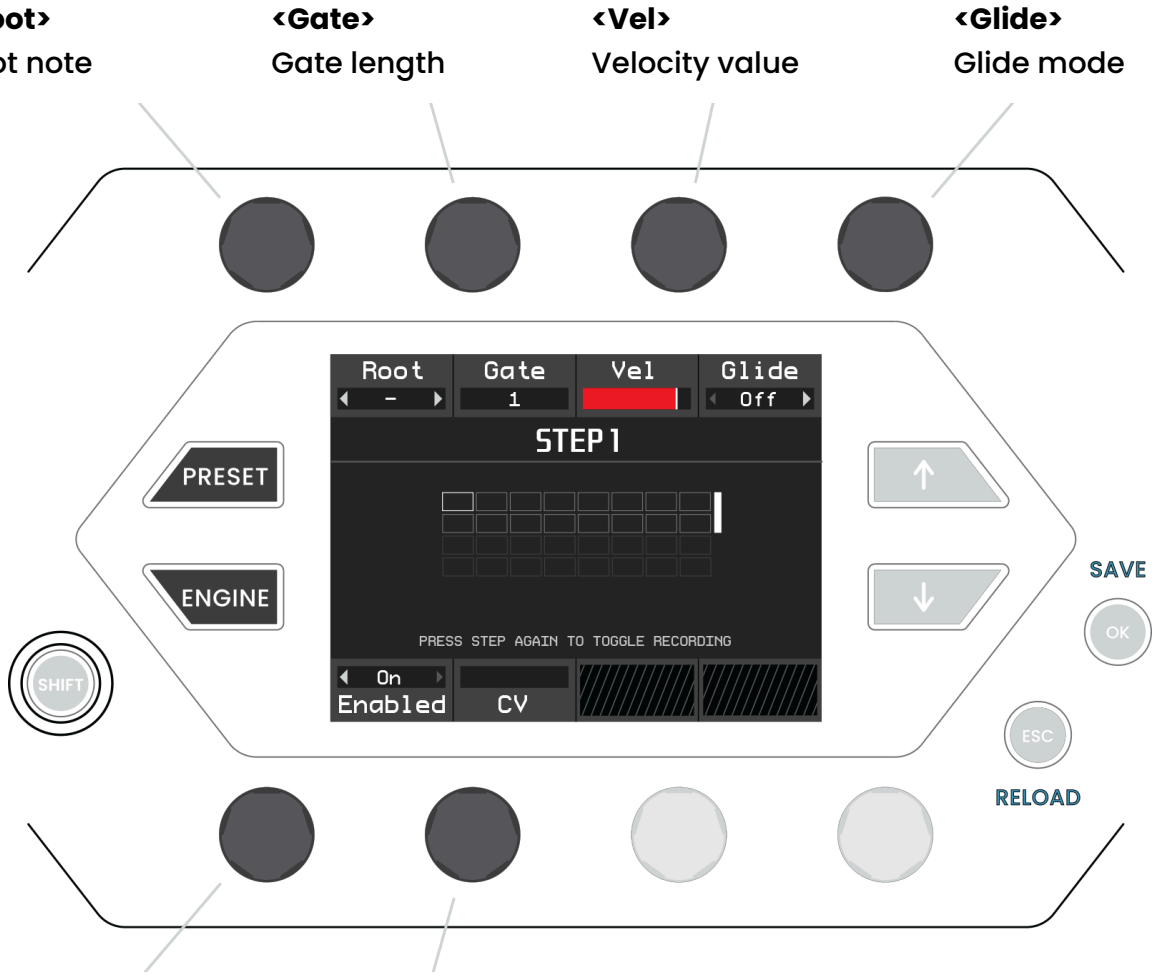
‹Steps›
Max step amount

‹Length›
Step length
(Musical division)

Parameter	Value	Description
‹Steps› Max step amount	1 … 32	Sequence max step amount.
‹Length› Step length (Musical division)	1/128 … 1/16 … 1/1	Sets the step length by dividing BPM into musical rhythmic divisions (default: 1/16).

STEP:

The STEP page provides per-step parameters, allowing you to set step enable, root note, gate length, velocity, CV value, and glide. A step must be enabled and assigned a root note to produce sound.



Parameter	Value	Description
‹Root› Root note	-, C-2 … G8	Root note.
‹Gate› Gate length	0% … 100%	Gate length.
‹Vel› Velocity value	0% … 100%	Velocity (default= 80%).
‹Glide› Glide mode	Off, Note, CV, Note+CV	Glide mode.
‹Enabled› Step enabled	On, Off	Step On / Off.
[CV] CV value	-100% … +100%	CV value (bipolar).

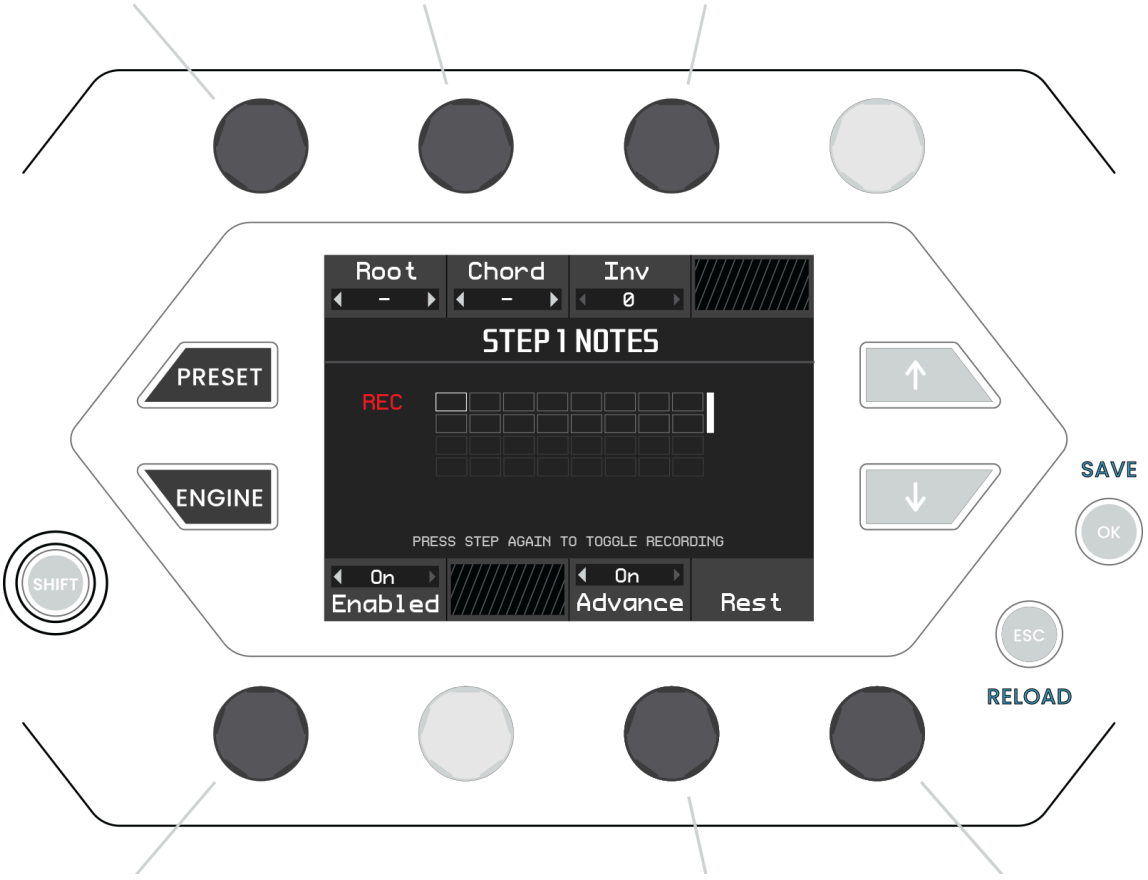
NOTES:

The NOTES page defines the musical content of each step, including root note, chord, inversion, rests, and ties. It also supports step-based note entry with automatic step advance.

‹Root›
Root note

‹Chord›
Chord type

‹Inv›
Chord inversion



‹Enabled›
Step enabled

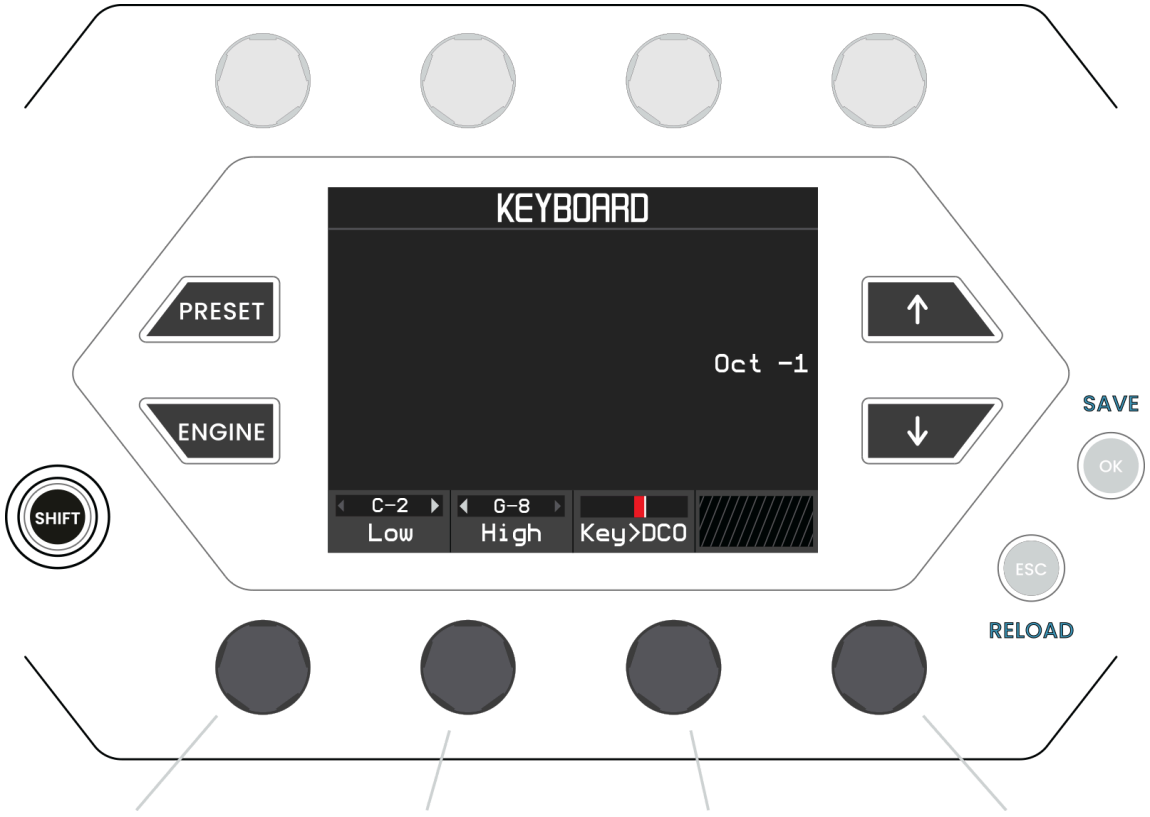
‹Advance›
Note entry advance mode

‹Rest/Tie›

Parameter	Value	Description
‹Root› Root note	-, C-2 … G8	Sets the root note for the currently selected step.
‹Chord› Chord	See appendix-E.	Sets the chord type for the currently selected step.
‹Inv› Chord inversion	0,1,2,3	Chord inversion.
‹Enabled› Step enabled	On, Off	Step enabled.
‹Advance› Note entry advance mode	On, Off	Note entry advance mode.
[Rest] Step rest / tie		Step rest / tie.

KEY

Key Follow (also known as Keyboard Tracking) is a modulation source derived from the pitch of incoming MIDI notes. It allows different keys across the keyboard to modulate sound parameters, adding pitch-responsive behavior to the instrument.



‹Low›
Low-note limit

‹High›
High-note limit

‹Key›DCO›
Key to DCO modulation amount

Parameter	Value	Description
‹Low› Low-note limit	C-2 … G8	Sets the lowest received MIDI note for the currently selected part in semitones.
‹High› High-note limit	C-2 … G8	Sets the highest received MIDI note for the currently selected part in semitones.
‹Key›DCO› Key to DCO mod amount	-400% … +400%	Sets the Key Follow for the DCO (Oscillator Pitch). This setting must be adjusted to 100% for “normal playing”.

TIP:
Press and hold the **‹Key›DCO›** Soft Knob while turning it to select values: -100%, 0%, and +100% (default).

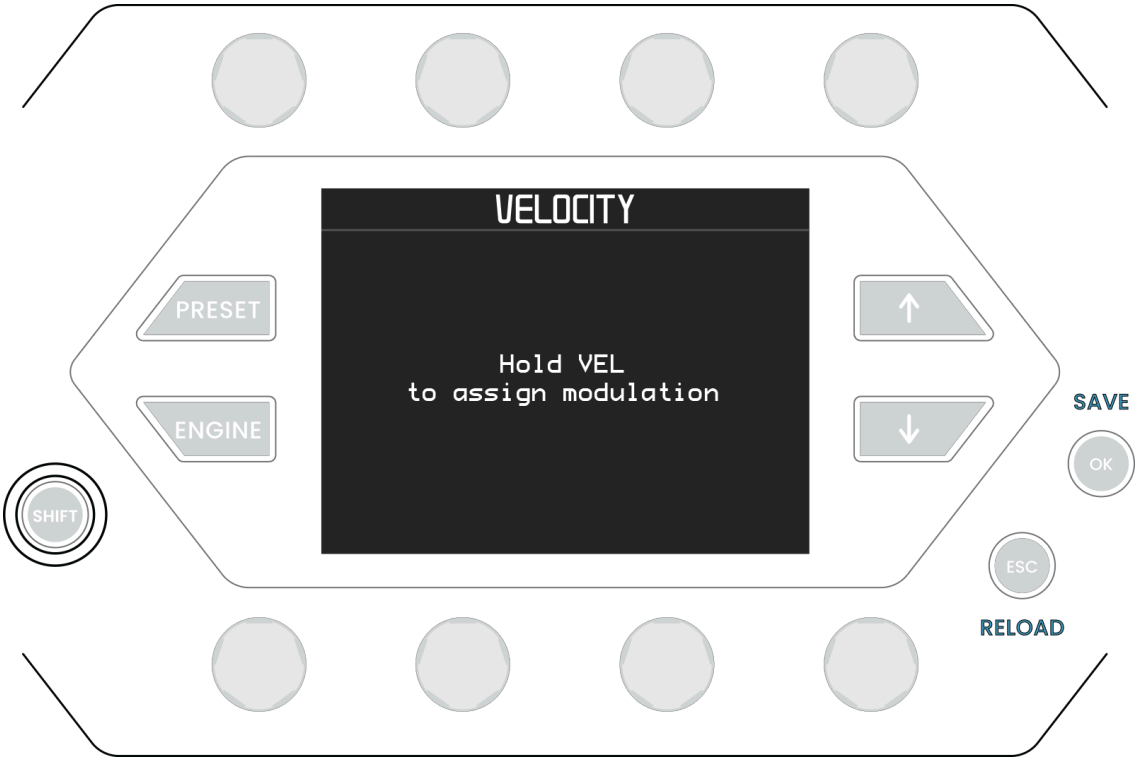
NOTE:
The fixed zero point is MIDI note number 69 (A4).

Practical ideas for KEY modulations:

- Filter cutoff modulation - The **KEY** modulates the **CUTOFF** of the filter to create a brighter timbre with higher notes.
    - Press the **[VCF]** button, and turn the **‹Key›** Soft Knob to adjust the modulation.
- LFO rate modulation - The **KEY** modulates the **‹Rate›** of the **[LFO 1]** to create a faster vibrato with higher notes.
    - Hold the **[LFO 1]** button, press the **[PERFORM]** button, and turn the **‹Pitch›** Soft Knob to assign and adjust modulation.
    - Hold the **[KEY]** button, press the **[LFO 1]** button, and turn the **‹Rate›** Soft Knob fully clockwise for the maximum mod amount.

VEL

Note-on (and note-off) velocity can be used as a modulation source, allowing for dynamic, expressive control over various sound parameters based on how hard a key is pressed, or how fast it is released. Unlike a simple on/off trigger, velocity-sensitive modulation can mimic the natural response of many acoustic instruments.



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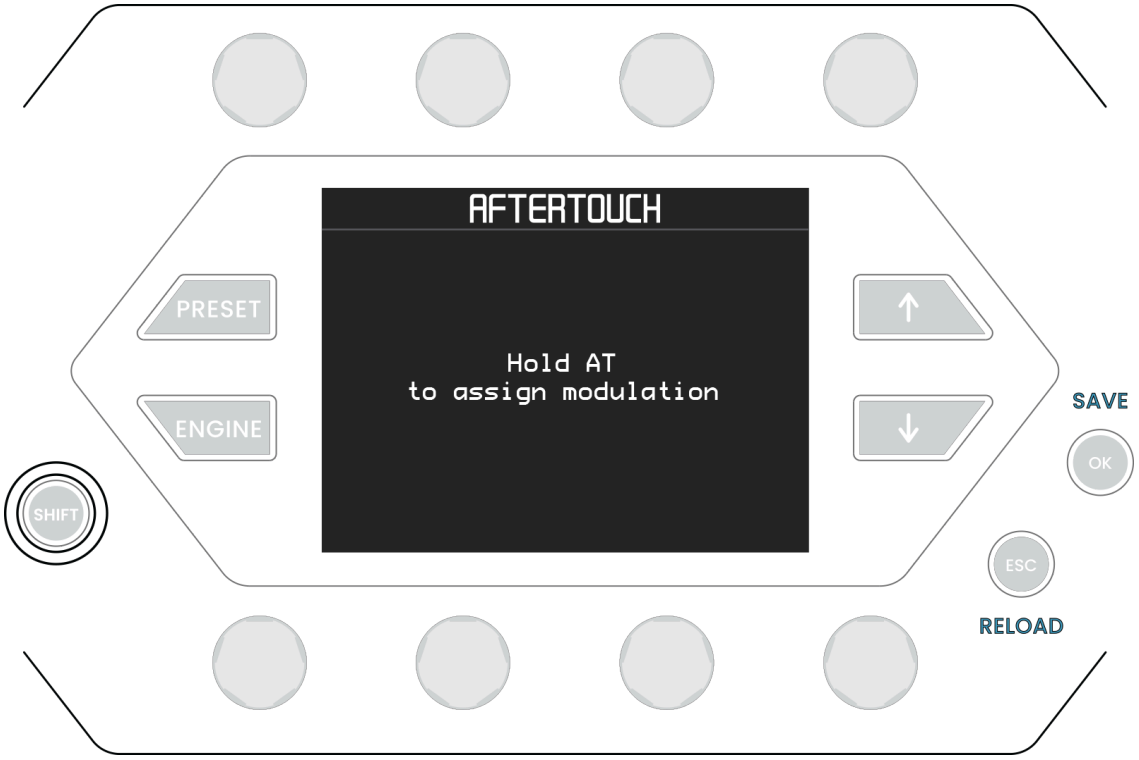
Practical ideas for VEL modulations:

- VCA amplitude modulation - The **VEL** modulates the **AMP** (amplitude). The harder key presses (=MIDI note-on velocity) produce a louder sound.
    - Press the **[AMP]** button, and turn the **<Vel>** Soft Knob to adjust the modulation.
- VCF ENV intensity modulation - The **VEL** modulates the intensity of **VCF ENV** modulating the **VCF** cutoff. The higher MIDI note-on velocity values produce a brighter sound.
    - Press the **[VCF]** button, and turn the **<Vel>** Soft Knob to adjust the modulation.
- VCF Envelope modulation - **VEL** modulates the envelopes **<Atk>**. The softer key presses result in a slower attack, while harder presses create a snappier response.
    - Adjust **VCF ENV <Atk>** to have a relatively slow attack. Adjust the **[CUTOFF]** and **[ENV AMT]** to hear the effect of the **VCF-ENV**.
    - Press the **[VEL]** button, and turn the **<Atk>** Soft Knob counterclockwise to adjust the modulation.

AT

Aftertouch is a dynamic modulation source that activates when additional pressure is applied to a key after it has been pressed (depending on the controller or keyboard used). It allows for real-time expressive control without needing to use extra knobs, wheels, or pedals. Redshift 6 responds to both Channel and Polyphonic Aftertouch.



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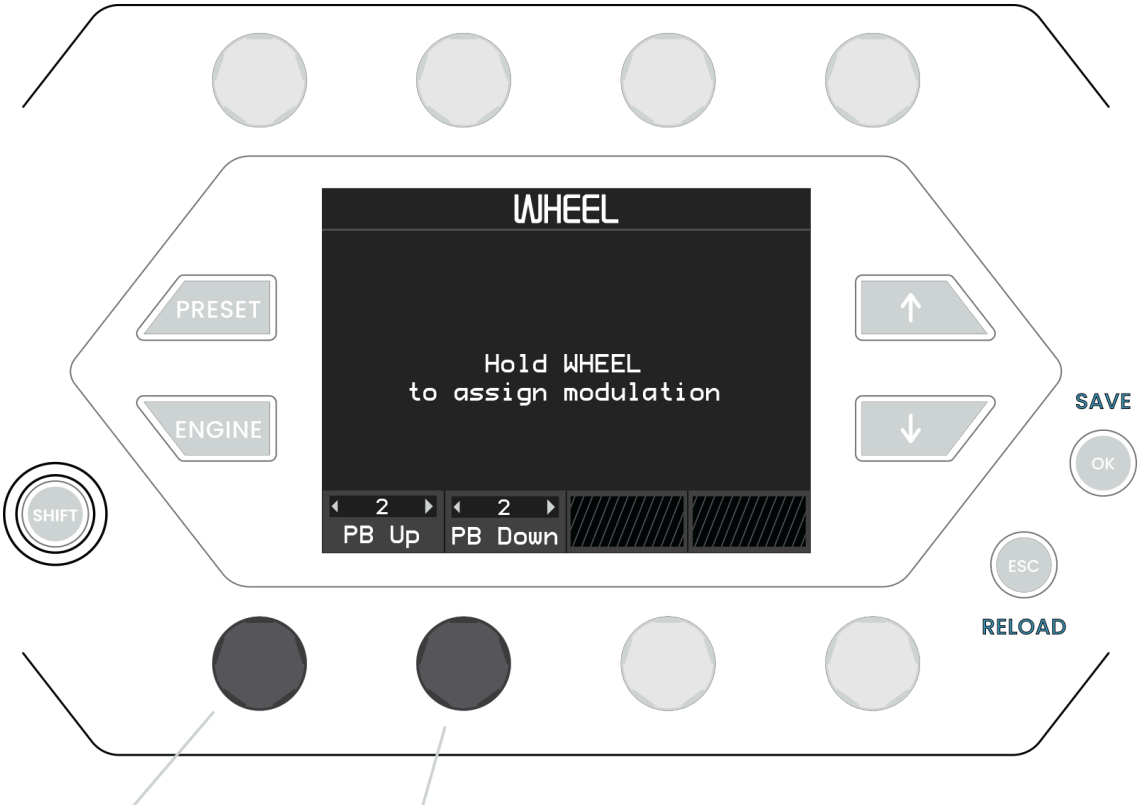
Practical ideas for AT modulations:

- VCF cutoff modulation - The **AT** modulates the cutoff of the **VCF**. The harder key press (= high AT value) produces a brighter sound.
    - Hold the **[AT]** button, and turn the **[CUTOFF]** knob to adjust the modulation.
- DCO pitch modulation - The **AT** adjusts the amount of **LFO1** modulating the **DCO** pitch.
    - Hold the **[LFO] + [AT]**buttons, press the **[DCO]** button, and turn the **<Pitch>** Soft Knob to adjust the modulation.

WHEEL

The Pitch Wheel and the Modulation Wheel are the most commonly used modulation sources in synthesizers, allowing players to dynamically control various parameters in real-time, adding expressiveness and movement to sounds.



‹PB Up›
Pitch Wheel
Semitones up

‹PB Down›
Pitch Wheel
Semitones down

Parameter	Value	Description
‹PB Up› Pitch Bend Wheel Semitones up	0 … 24	Sets the maximum effect of the “Pitch Bend Wheel up” in semitones.
‹PB Down› Pitch Bend Wheel Semitones down	0 … 24	Sets the maximum effect of the “Pitch Bend Wheel down” in semitones.

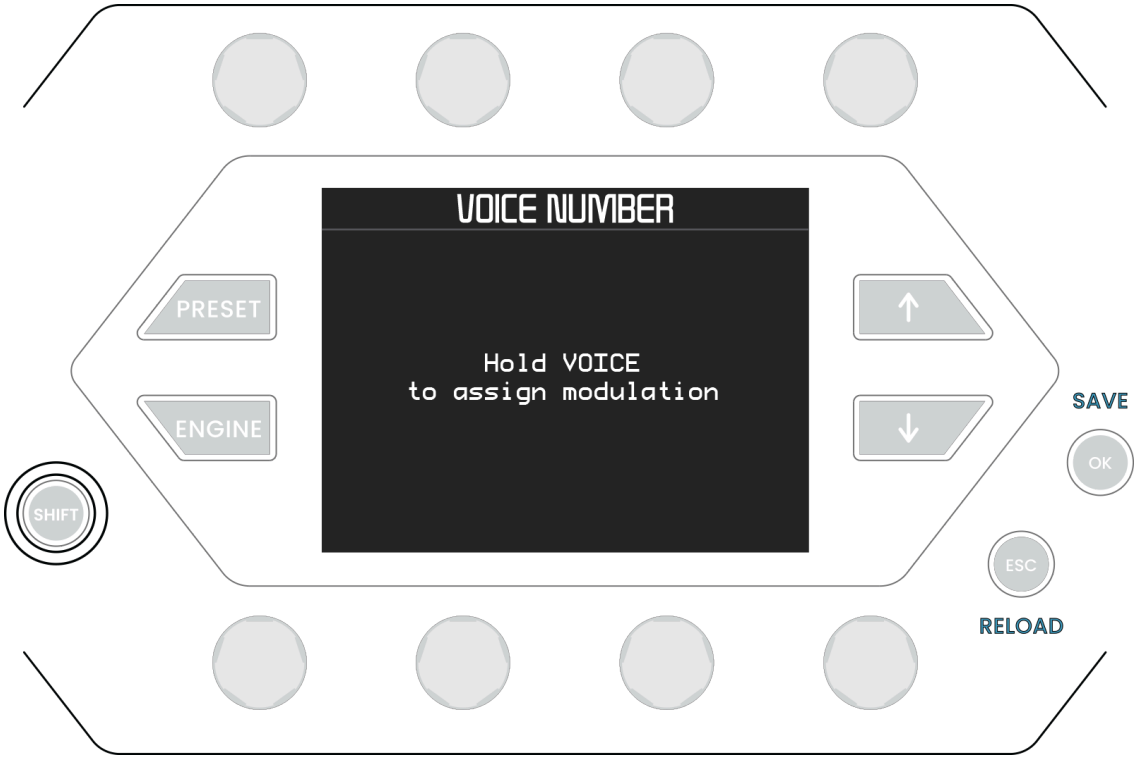
Note:
While in MPE mode, the **<PB Up>** and **<PB Down>** parameters have no effect. Depending on your MPE controller, it might configure these automatically (see your MPE controller's manual). If not, or if you want to override the configuration, you can set the "main and note PB range" parameters at the **[SETTINGS]** page while using the MPE **<Mode>** "Manual".

Practical ideas for WHEEL modulations:

- DCO Pitch modulation (vibrato) - The Modulation Wheel controls the intensity of the LFO modulating the DCO pitch.
    - Hold the **[LFO1] + [WHEEL]** buttons, press **[PERFORM]**, and adjust **<Pitch>** Soft Knob.
- Filter cutoff modulation - The Modulation Wheel controls the **CUTOFF** of the filter making the sound brighter or darker.
    - Hold the **[WHEEL]** button, and turn the **<CUTOFF>** knob to adjust the modulation.

VOICE

Voice refers to a fixed value that is assigned to all available Voices. Refer to APPENDIX Modulation Sources for all available variations.



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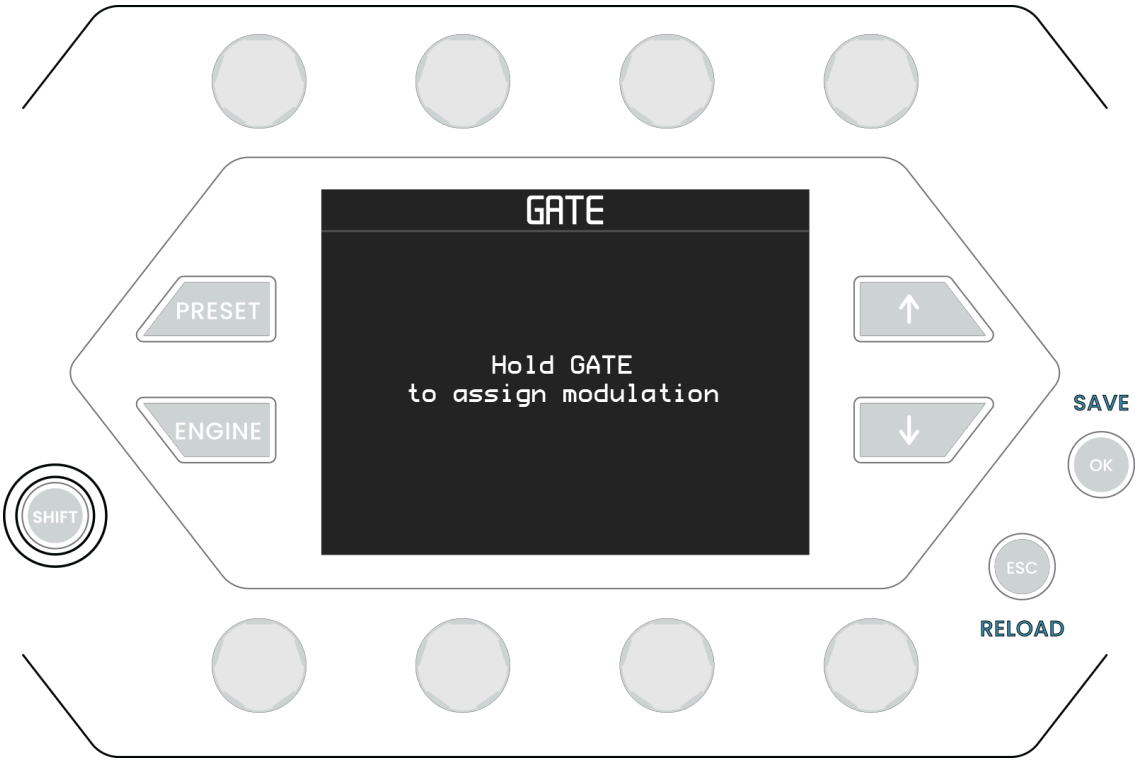
Practical ideas for VOICE modulations:

- Stereo Panning - The **VOICE** modulates the **AMP <Pan>** for a stereo panning effect, creating a wider and more immersive spatial experience.
    - Hold the **[VOICE]** button, press the **[AMP]** button, and turn the **<Pan>** Soft Knob to adjust the modulation.

GATE

The Gate is an On/Off type (MIN/MAX) of modulation source, triggered by a MIDI note-on message (a key press). It is used for triggering all Envelopes, but it also can modulate other modulation destinations.



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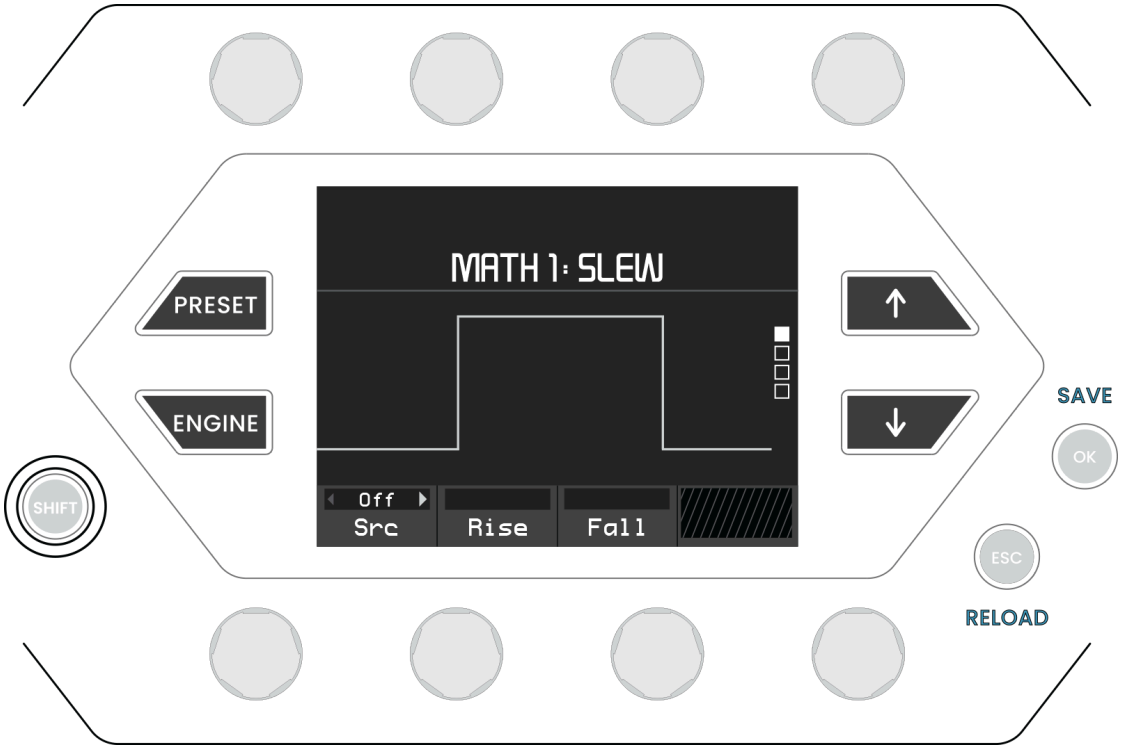
Practical ideas for GATE modulations:

- Balance Modulation - The **GATE** modulates the **[BALANCE]** for a timbre change at the **AMP ENV** Release stage.
    - Adjust **[DCO]** page **<tune2>** Soft Knob to -1 oct.
    - Adjust the [AMP ENV] page **<Rel>** Soft Knob to a relatively long Release.
    - Hold the **[GATE]** button, press the **[AMP]** button, and turn the **[BALANCE]** Soft Knob fully clockwise to assign the modulation.

MATH

The MATH page contains mathematical utilities for processing modulation signals. Modulation sources can be combined, scaled, inverted, and transformed to create more complex modulation behaviors throughout the synthesizer.

Each Part provides four independent MATH slots. Use the ENGINE button to select the processing ENGINE for the current slot, and the arrow buttons to navigate between the available slots. The output of a MATH slot behaves like any other modulation source: it can be quick-assigned directly to modulation destinations or routed back into another MATH slot, and edited in detail within the Mod Matrix for more advanced modulation routing and control.



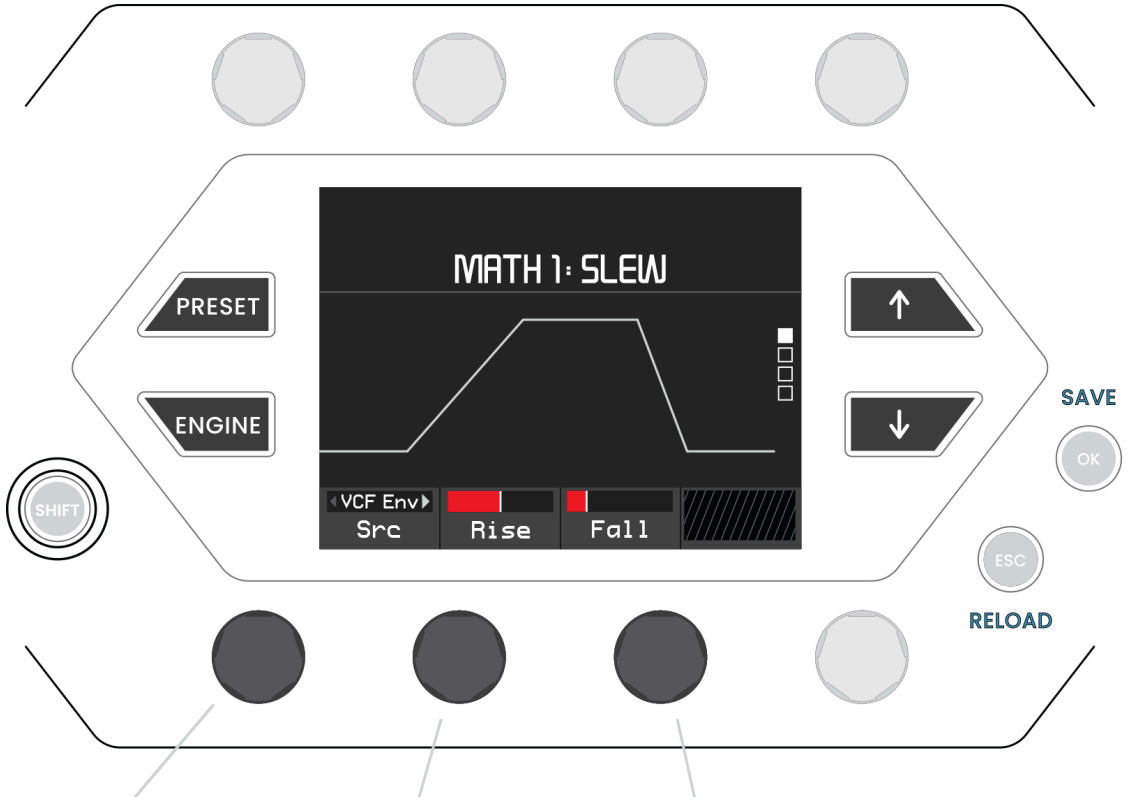
MATH ENGINES:

Name	Control	Description
MATH: SLEW	Internal	Slows sudden changes in a modulation signal, creating smoother transitions.
MATH: CURVE	Internal	Reshapes a modulation signal using an adjustable response curve.
MATH: FOLD & CLIP	Internal	Applies wavefolding or clipping to a modulation signal, creating more complex shapes.
MATH: QUANTIZE	Internal	Converts a modulation signal into a selectable number of discrete steps.
MATH: MULTI-VIA	Internal	Combines multiple modulation sources into a single processed output.
MATH: SAMPLE & HOLD	Trigger	Samples a source signal when triggered and holds the captured value.
MATH: TRACK & HOLD	Mod	Tracks the input signal while active, then holds the last value when above the threshold.
MATH: SWITCH	Trigger	Switches between 2-4 modulation sources using a trigger signal.
MATH: CROSSFADE	Mod	Smoothly blends between 2-4 modulation sources using a modulation signal for crossfade control.

NOTE:
In addition to the MATH engine's own parameters, the "Control" column indicates whether its behavior can be influenced by a Mod source, a Trigger source, or only by its internal settings.

MATH: SLEW

Slew limits how quickly a modulation signal can change, slowing down sudden movements and creating smoother, more natural transitions. The rates of positive and negative value changes can be adjusted independently, allowing different rise and fall times for the processed signal.



‹Src›
Mod source

‹Rise›
Rise time

‹Fall›
Fall time

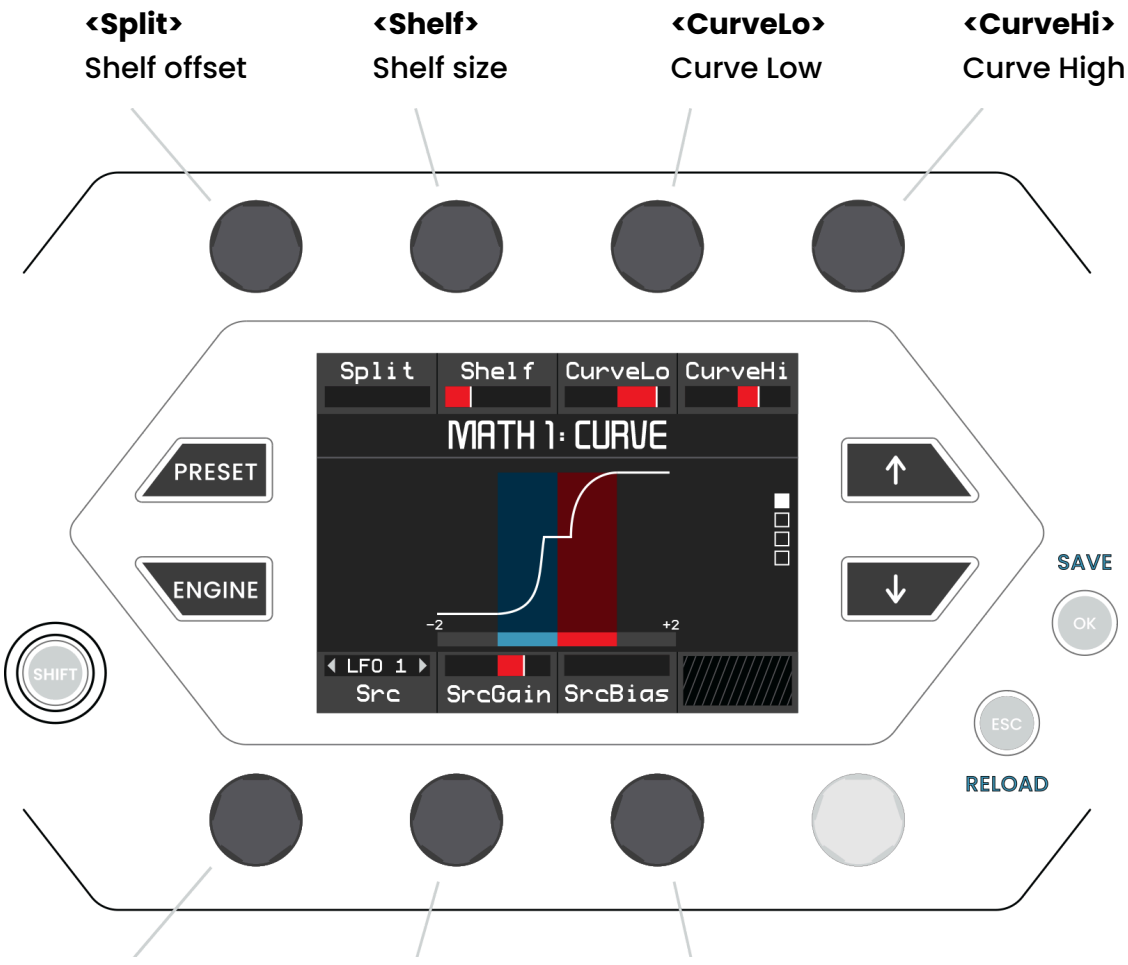
Parameter	Value	Description
<Src> Mod source	Mod sources	Selects the modulation source.
<Rise> Rise time	0% … 100%	Sets how quickly the output can increase in value.
<Fall> Fall time	0% … 100%	Sets how quickly the output can decrease in value.

Practical ideas for MATH: SLEW modulations:

- "Asymmetrical Glide Lead" - Use **MATH: SLEW** engine as a mod source for controlling the **<pitch>** at **[PERFORM]** page.
    - Adjust **[KEY] <Key>DCO>** to zero.
    - Set **<Poly>** to "1" at **[PARTS]** page.
    - Adjust **MATH: SLEW** to ~50% **<Rise>** or **<Fall>**, and set **KEY** as **<Src>**.
    - Assign **MATH: SLEW** to modulate **<pitch>** at **[PERFORM]** with 100% amount.

MATH: CURVE

Curve applies independent nonlinear shaping to the lower and upper portions of a modulation signal, with an adjustable deadband (shelf) region between them. Separate low and high curve controls allow anything from subtle response shaping to extreme modulation remapping.



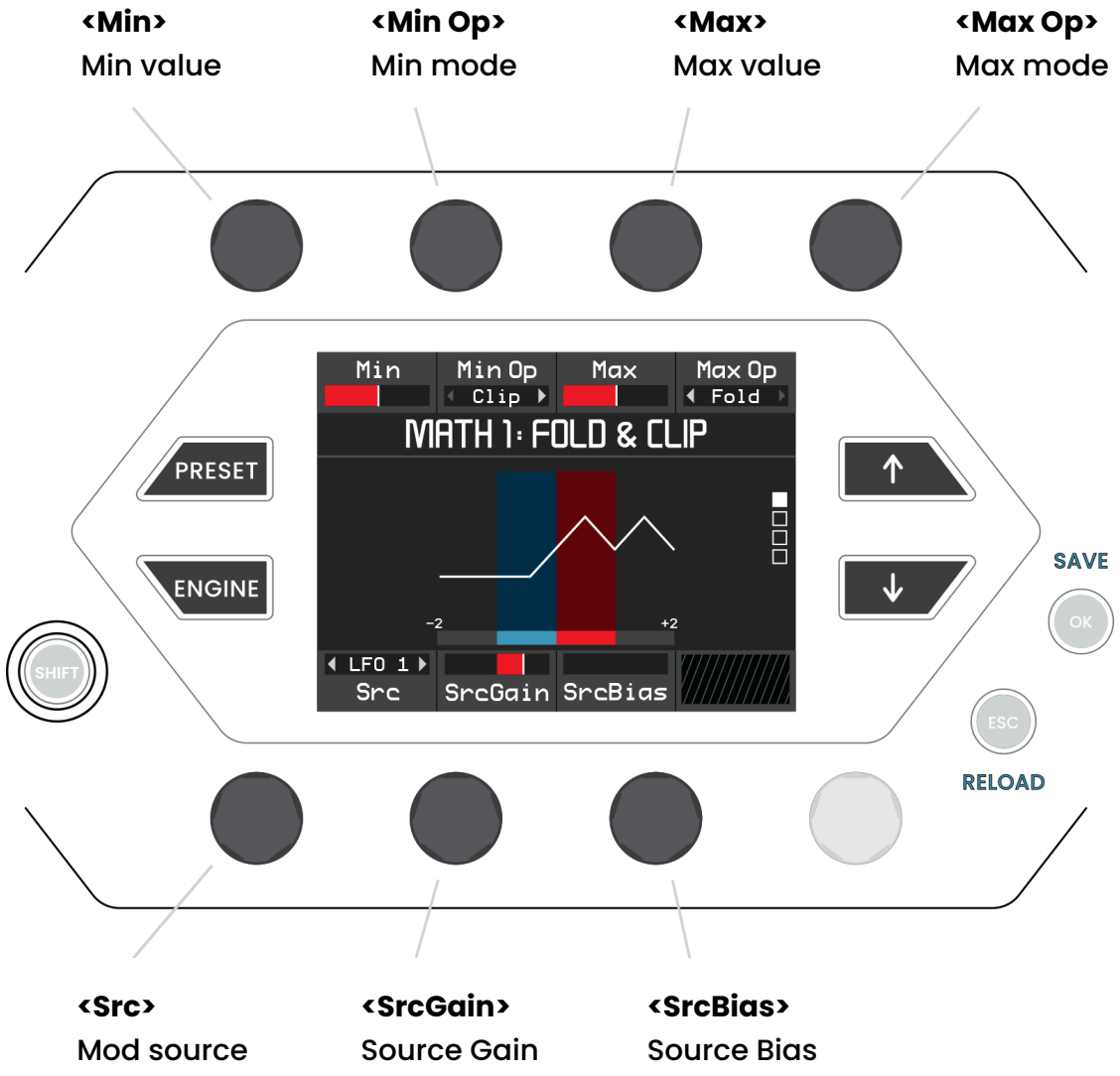
Parameter	Value	Description
‹Split› Shelf offset	-100% … +100%	Sets the point where the negative and positive curves meet.
‹Shelf› Shelf size	0% … +100%	Sets the length of the center portion (shelf).
‹CurveLo› Curve Low	-100% … +100%	Adjusts the curve shape below the Split point.
‹CurveHi› Curve High	-100% … +100%	Adjusts the curve shape above the Split point.
‹Src› Mod source	Mod sources	Selects the modulation source.
‹SrcGain› Source Gain	-200% … +200%	Adjusts the source signal level before processing.
‹SrcBias› Source Bias	-100% … +100%	Adds a fixed offset to the source signal before processing.

Practical ideas for MATH: CURVE modulations:

- Asymmetric LFO - Use **MATH: CURVE** to convert triangle LFO to an asymmetrical shaped modulation source for **‹Tune2›**.
    - Set **LFO 1 ‹Wave›** to “Tri”, **‹Rate›** to +50%, **‹Sync›** “NoteOn”.
    - Set **MATH: CURVE ‹Src›** to **LFO 1**, adjust **‹CurveLo›** and **‹CurveHi›** to your liking.
    - Assign **MATH: CURVE** to modulate **‹Tune2›** just a tiny bit (use **SHIFT** -lock to access fine tuning mode).

MATH: FOLD & CLIP

Fold & Clip applies independent processing to the upper and lower signal limits. When the signal exceeds a limit, it can either be clipped to that limit or folded back into range. Separate modes for the low and high thresholds allow a wide variety of nonlinear modulation shapes, from simple limiting to complex wavefolding effects.



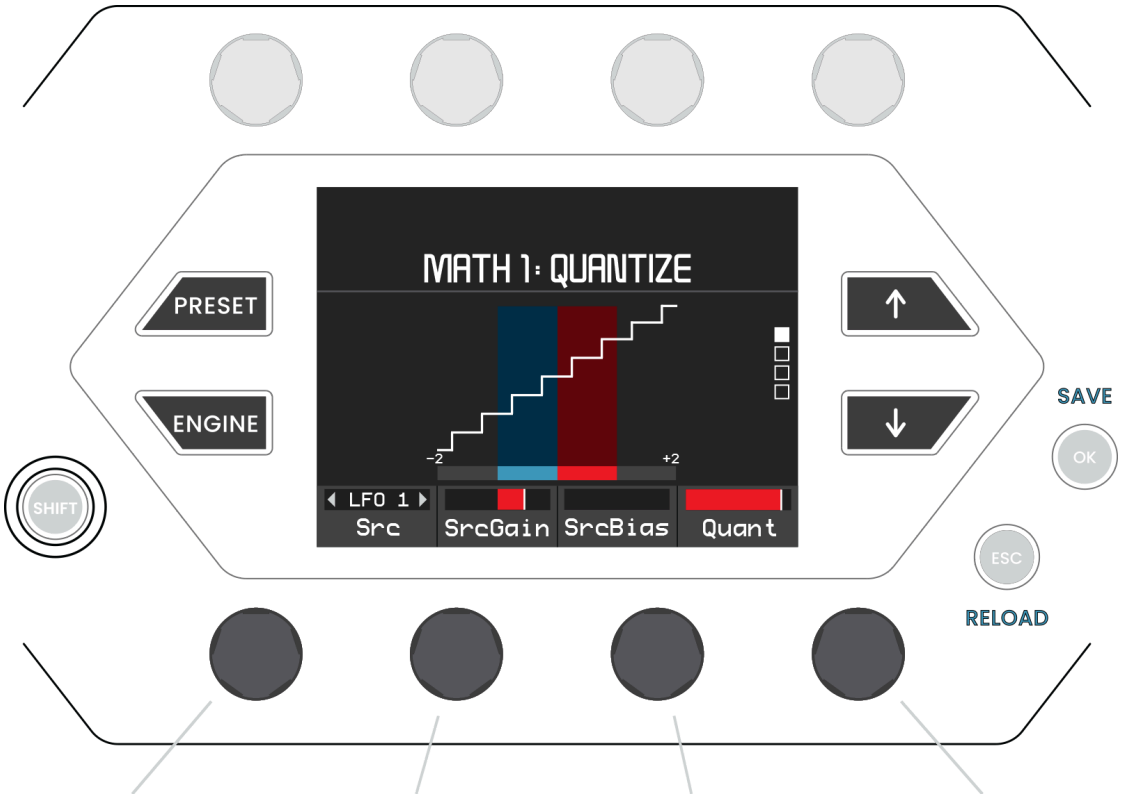
Parameter	Value	Description
‹Min› Min value	-100% … 0%	Threshold value for Min Fold/Clip.
‹Min Op› Min Mode	Fold, Clip	Fold – Inverts the signal back into range. Clip – Limits the signal to the min value.
‹Max› Max value	0% … +100%	Threshold value for Max Fold/Clip.
‹Max Op› Max mode	Fold, Clip	Fold – Inverts the signal back into range. Clip – Limits the signal to the max value.
‹Src› Mod source	Mod sources	Selects the modulation source.
‹SrcGain› Source Gain	-200% … +200%	Adjusts the source signal level before processing.
‹SrcBias› Source Bias	-100% … +100%	Adds a fixed offset to the source signal before processing.

Practical ideas for MATH: FOLD & CLIP modulations:

- Bipolar Pitch Envelope - Use **MATH: FOLD & CLIP** to convert **AUX ENV** from unipolar to bipolar mod source for **‹Pitch›** modulation.
    - Select **MATH: FOLD & CLIP**, use **Aux Env** as **‹Src›**, max value for **‹SrcGain›**, set -50% for **‹SrcBias›**, “Fold” as **‹Max Op›**, “Clip” as **‹Min Op›**, +75% for **‹Max›**, and tune the **‹Min›** to your liking.
    - Set **Aux Env ‹Atk›**, **‹Dec›**, **‹Sus›** to ~+50%. Set **‹Rel›** max and **‹Reset›** “On”.
    - Assign **MATH: FOLD & CLIP** to **‹Pitch›** or **‹Tune2›** (DCO: DUAL), set mod amount to your liking.

MATH: QUANTIZE

Quantize converts a continuous modulation signal into a stepped output with a selectable number of discrete levels. Useful for creating stepped pitch changes, rhythmic parameter jumps, and sequencer-like effects from smooth modulation sources.



‹Src›
Mod source

‹SrcGain›
Source Gain

‹SrcBias›
Source Bias

‹Quant›
Quantize

Parameter	Value	Description
<Src> Mod source	Mod sources	Selects the modulation source.
<SrcGain> Source Gain	-200% … +200%	Adjusts the source signal level before processing.
<Bias> Source Bias	-100% … +100%	Adds a fixed offset to the source signal before processing.
<Quant> Quantize	1/2 1/3 1/4 1/5 1/6 1/7 1/8 1/16 1/48	The number of quantized steps.

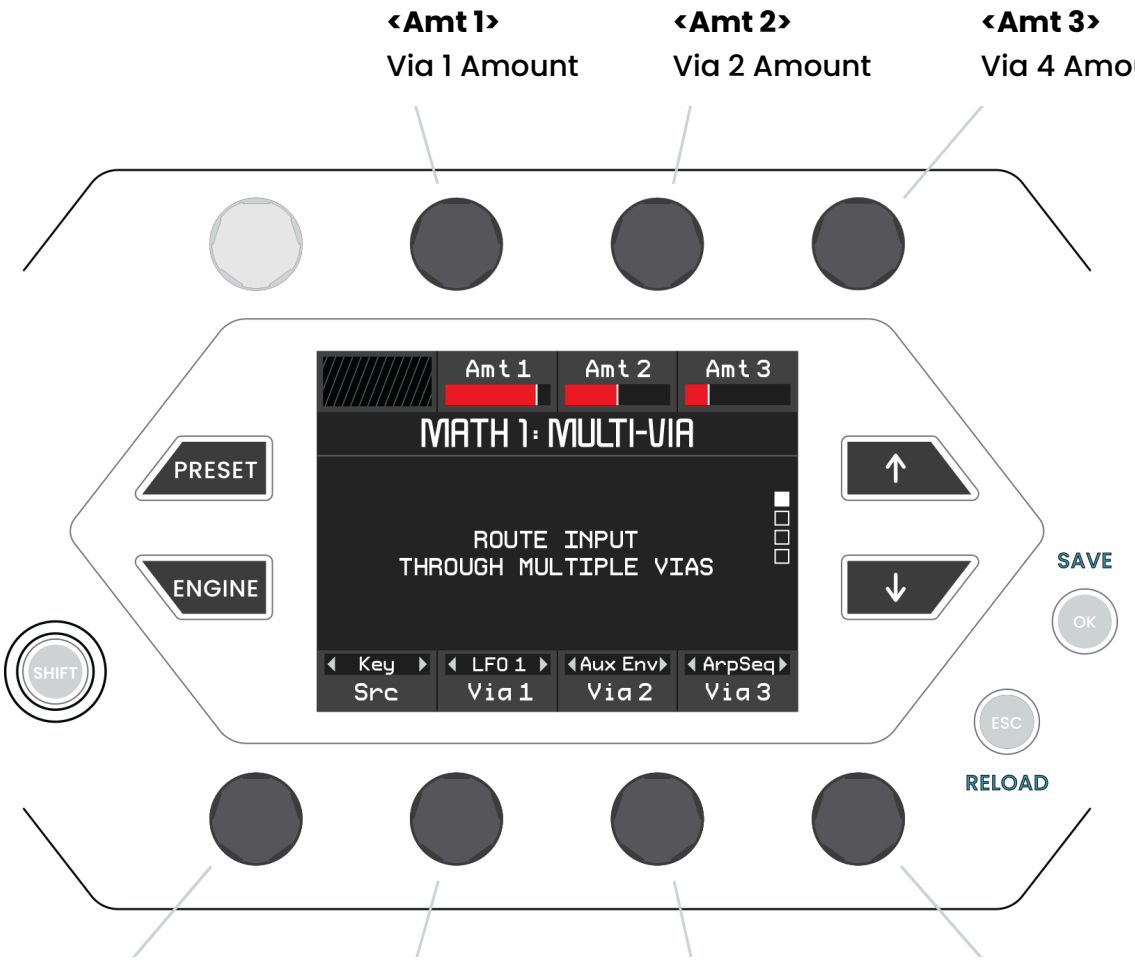
TIP:
Use **<Quant>** value "1/48" with max modulation amount for **<Pitch>** to get 12 semitones in an octave.

Practical ideas for MATH: QUANTIZE modulations:

- Quantized Cutoff - Use **MATH: QUANTIZE** to get stepped modulation from the **LFO** for the filter **[CUTOFF]**.
    - Select **MATH: QUANTIZE**, set **LFO 1** as **<Src>**, "+0,5" for **<SrcGain>**, max value for **<SrcBias>**, and value "1/16" (middle value) for **<Quant>**.
    - Set **LFO 1 <Sync>** to "Clock".
    - Lower the overall **[CUTOFF]** to medium value, adjust **[RESONANCE]** to near max, and assign **MATH: QUANTIZE** to modulate **[CUTOFF]** with +50% amount.
    - Experiment with **<Quant>** value and **LFO 1 <Rate>**.

MATH: MULTI-VIA

MULTI-VIA mixes one modulation source with up to three via sources, each with its own amount control, into a single combined modulation signal.



‹Amt 1›
Via 1 Amount

‹Amt 2›
Via 2 Amount

‹Amt 3›
Via 4 Amount

‹Src›
Mod source

‹Via 1›
Via 1 mod source

‹Via 2›
Via 2 mod source

‹Via 3›
Via 3 mod source

Parameter	Value	Description
<Amt 1> Via 1 Amount	0% … 100%	Sets the effect of Via 1 in determining the output.
<Amt 2> Via 2 Amount	0% … 100%	Sets the effect of Via 2 in determining the output.
<Amt 3> Via 3 Amount	0% … 100%	Sets the effect of Via 3 in determining the output.
<Src> Mod source	Mod sources	Selects the modulation source.
<Via 1> Via 1 mod source	Mod sources	Selects the modulation source.
<Via 2> Via 2 mod source	Mod sources	Selects the modulation source.
<Via 3> Via 3 mod source	Mod sources	Selects the modulation source.

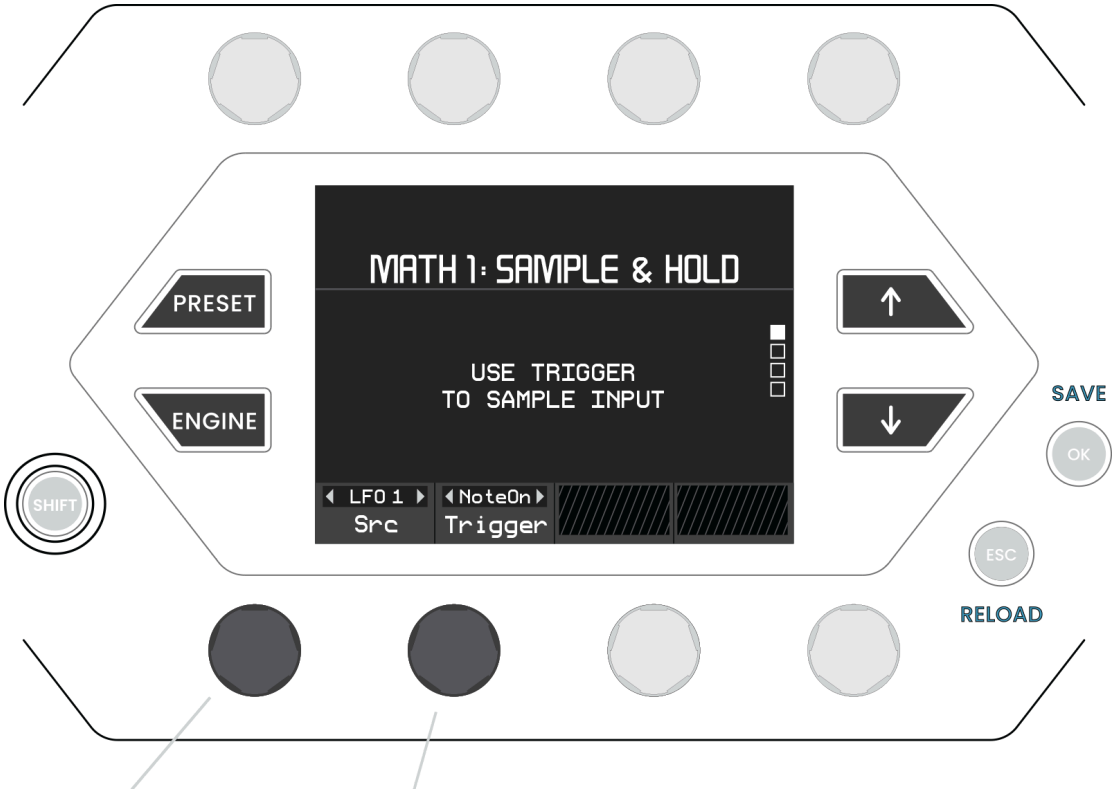
NOTE: if **<Src>** is set to “Off”, the output remains Off, regardless of any active Via sources. Likewise, if **<Amt x>** is 100% but it's **<Via x>** set to “Off”.

Practical ideas for MATH: MULTI-VIA modulations:

- “Growl Brass” - Use **MATH: MULTI-VIA** engine as a mod source for controlling the **<Pitch>** at **[PERFORM]** page.
  - Adjust **[LFO1] <Wave>** to Tri and **<Rate>** to ~75%.
  - Adjust **[AUX ENV]** to fast **<Decay>** and min **<Sustain>**.
  - Configure **Multi-via**:
    - **LFO1** as **<Src>**,
    - **AUX ENV** as **<Via 1>** with 100% **<Amt 1>**,
    - **VEL** as **<Via 2>** with 100% **<Amt 2>**,
    - **KEY** as **<Via 3>** with 100% **<Amt 3>**.
  - Assign **MATH: MULTI-VIA** output to modulate **<Pitch>** at **[PERFORM]**.

MATH: SAMPLE & HOLD

Sample & Hold converts a continuously changing modulation source into stepped values by updating only when triggered.



‹Src›
Mod source

‹Trigger›
Trigger source

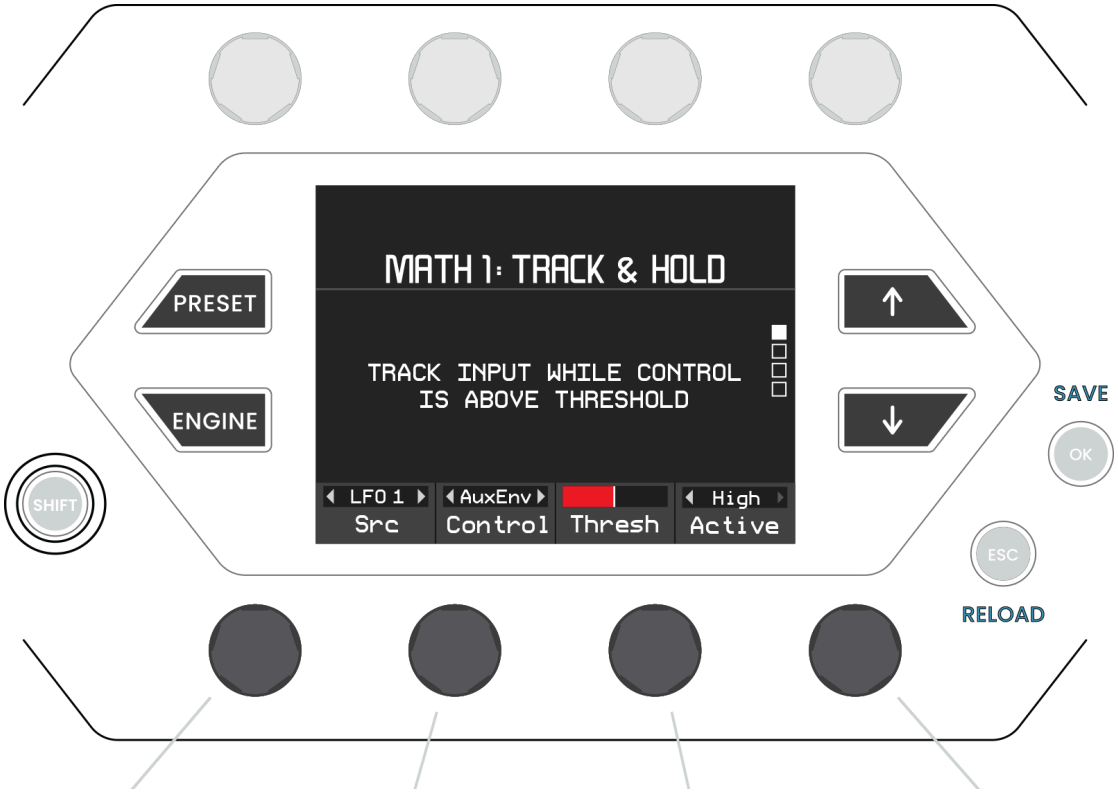
Parameter	Value	Description
<Src> Mod source	Mod sources	Selects the modulation source.
<Trigger> Trigger source	Trigger sources	Selects the trigger source.

Practical ideas for MATH: SAMPLE & HOLD modulations:

- "80's Arcade FXs" - Use **MATH: SAMPLE & HOLD** for controlling the **<Pitch>** at **[PERFORM]** Page.
    - Set **MATH: SAMPLE & HOLD <Src >** to **LFO 1**, and **<Trigger>** to **LFO 2**.
    - Use **MATH: SAMPLE & HOLD** output to modulate **<Pitch>** at **[PERFORM]** for 25%.
    - Set **LFO 1** and **LFO 2 <Rate>** to 75%, and **<Sync>** to "NoteOn". Fine-tune **LFO 1-2 <Rate>** for various 8-bit style sound-FXs.

MATH: TRACK & HOLD

Track & Hold continuously follows the input signal and holds its current value when the selected control source reaches its threshold. The held value is maintained until the control source crosses the threshold again. Useful for tempo-synced modulation freezes and rhythmic control.



‹Src›
Mod source

‹Control›
Control source

‹Thresh›
Threshold level

‹Active›
Track mode

Parameter	Value	Description
‹Src› Mod source	Mod sources	Selects the modulation source.
‹Control› Control source	Mod sources	Selects the control source.
‹Thresh› Threshold	-100% … +100%	Selects the threshold level for **‹Active›** Track mode.
‹Active› Track mode	Low, High	Tracking is active while above the threshold in “High” -mode, or below the threshold in “Low” -mode.

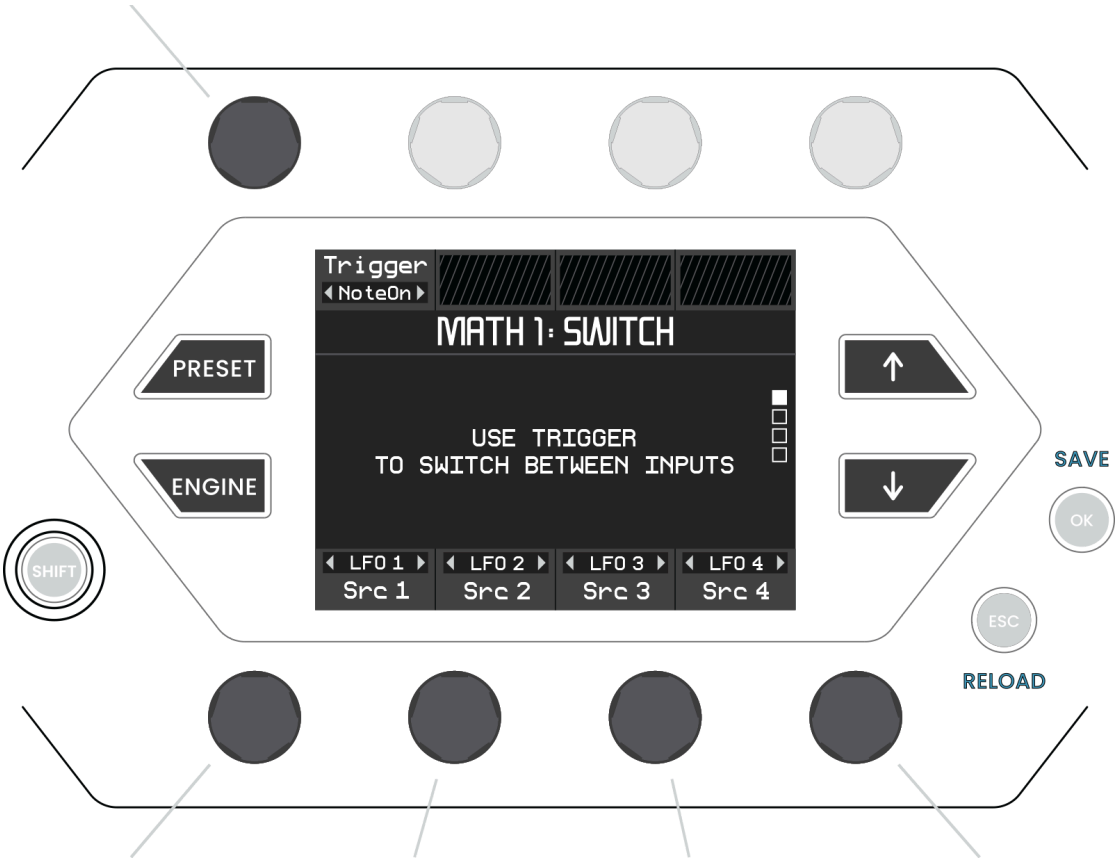
Practical ideas for MATH: TRACK & HOLD modulations:

- Rhythmic Filtering - Use **MATH: TRACK & HOLD** with **SEQ: POLY ‹CV›** to create rhythmic filtering.
    - Select **SEQ: POLY**, add various positive **‹CV›** values to steps 1-16 (no Root notes). Press **‹play›** to run the Sequencer at **[CLOCK]** page (or shortcut **CLOCK+OK**).
    - Set **MATH: TRACK & HOLD** with: “ArpSeq” as **‹Src›** and **‹Control›** and assign selected **MATH** to modulate **[CUTOFF]**. Set **[RESONANCE]** to ~90%.
    - Adjust **‹Thresh›** and **‹Active›** to your liking. Also, adjust the **SEQ: POLY ‹CV›** levels for creating different patterns, or even try using **ARP: CLASSIC.**

MATH: SWITCH

Switch cycles through up to four modulation sources in response to a trigger signal. Each trigger advances to the next active source in ascending order, wrapping from source 4 back to source 1, while inputs set to “Off” are automatically skipped.

‹Trigger›
Trigger input



‹Src 1›
Mod source 1

‹Src 2›
Mod source 2

‹Src 3›
Mod source 4

‹Src 4›
Mod source 4

Parameter	Value	Description
<Trigger> Trigger source	Trigger sources	Selects the trigger source that advances the switch to the next active mod source input.
<Src 1> Mod source 1	Mod sources	Selects the modulation source.
<Src 2> Mod source 2	Mod sources	Selects the modulation source.
<Src 3> Mod source 3	Mod sources	Selects the modulation source.
<Src 4> Mod source 4	Mod sources	Selects the modulation source.

Practical ideas for MATH: SWITCH modulations:

- "Complex LFO waveform" - Use **MATH: SWITCH** to combine up to four different LFO waveforms into a single complex modulation source.
    - Set **MATH: SWITCH <Trigger>** to **LFO 1**, **<Src 1>** to **LFO 1**, **<Src 2>** to **LFO 2**, **<Src 3>** to **LFO 3**, and **<Src 4>** to **LFO 4**.
    - Set all **LFO**s **<Sync>** to "Clock" and set various clock divisions with **<Rate>**, various waveforms with **<Wave>**, and adjust **<Phase>** to your liking.
    - Each trigger from **LFO 1** advances **MATH: SWITCH** to the next Src 1-4 (LFO 1-4), creating an evolving modulation pattern. Use **MATH: SWITCH** output to modulate **<Pitch>**, **<Cutoff>**, or any other modulation destination.

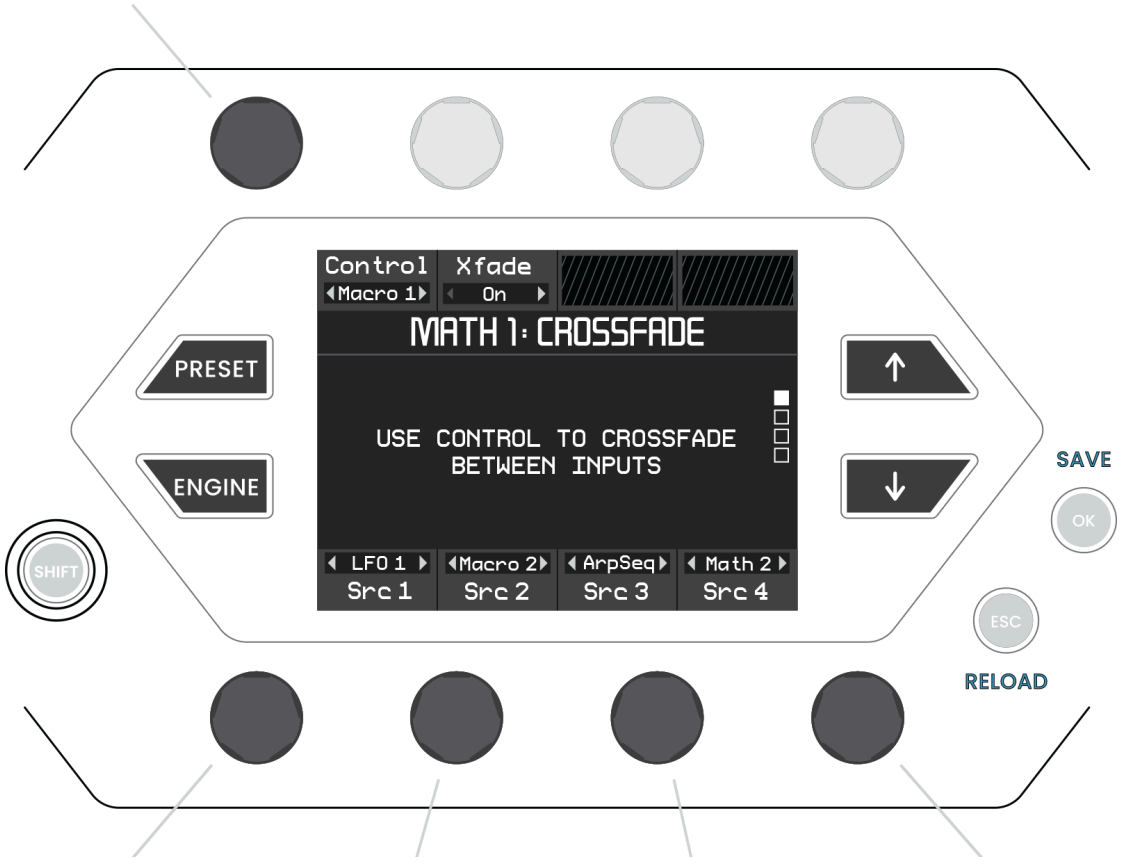
TIP:
Use **MATH: SLEW** with another MATH slot for smoother transitions between switching LFOs.

MATH: CROSSFADE

Crossfade uses a modulation source to smoothly scan through up to four modulation sources, creating seamless transitions between them as the control value changes. Inputs set to “Off” are automatically skipped.

‹Control›
Control mod source

‹Xfade›
Xfade mode



‹Src 1›
Mod source 1

‹Src 2›
Mod source 2

‹Src 3›
Mod source 3

‹Src 4›
Mod source 4

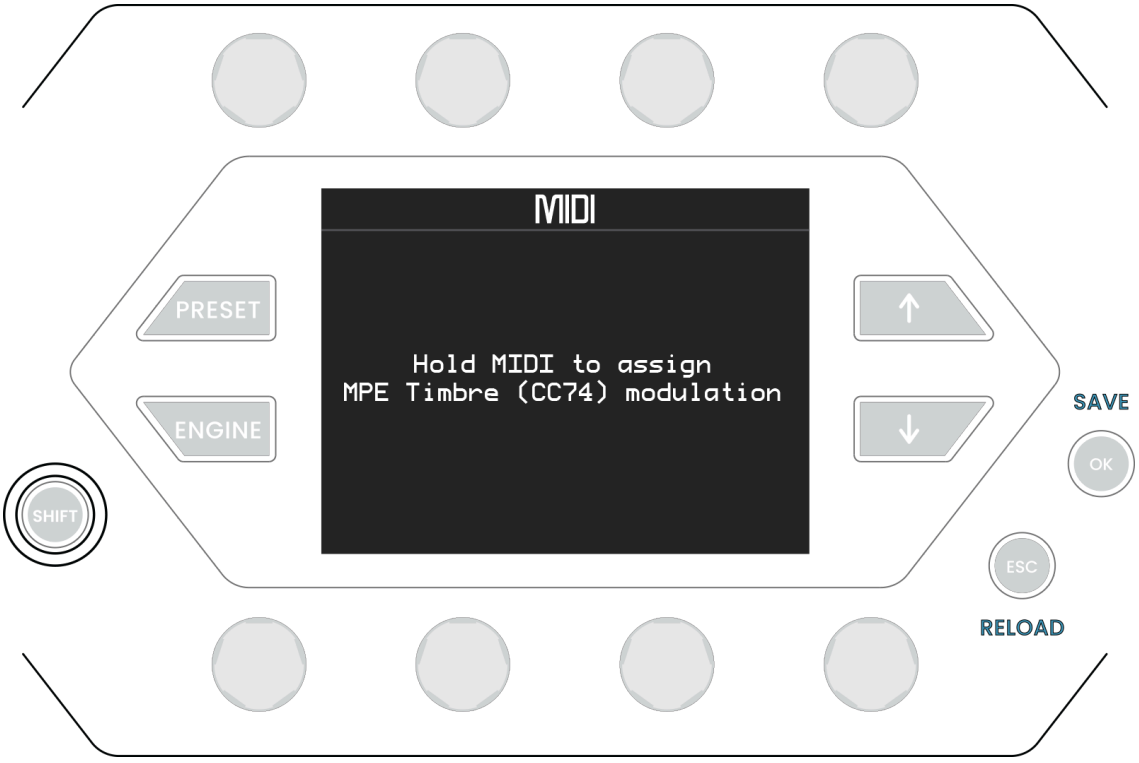
Parameter	Value	Description
<Control> Control mod source	Mod sources	Selects the modulation source that determines the crossfade position between the active inputs.
<Xfade> Xfade mode	On, Off	"On" crossfades between sources, while with "Off" the change is instant.
<Src 1> Mod source 1	Mod sources	Selects the modulation source.
<Src 2> Mod source 2	Mod sources	Selects the modulation source.
<Src 3> Mod source 3	Mod sources	Selects the modulation source.
<Src 4> Mod source 4	Mod sources	Selects the modulation source.

Practical ideas for MATH: CROSSFADE modulations:

- "Rhythmic Wave Balance" - Use **MATH: CROSSFADE** to modulate **[BALANCE]**.
    - Set MATH: CROSSFADE **<Control>** to **LFO 4, <Src 1>** to **LFO 1, <Src 2>** to **LFO 2,** and **<Src 3>** to **LFO 3**.
    - Set all **LFO**s **<Sync>** to "Clock" and set various clock divisions with **<Rate>**, various waveforms with **<Wave>**, and adjust **<Phase>** to your liking.
    - The shape of **LFO 4** will control which source 1-3 (LFO 1-3) will actively modulate the destination. Assign **MATH: CROSSFADE** to **[BALANCE]**, use **[DCO]** page parameters **<Wave 1>**, **<Wave 2>,** and **<Tune2>** (+7/+12) to select contrasting waveforms.

MIDI

MIDI modulation source is set to CC74 (MPE Timbre). Refer to your MPE controller for more info.



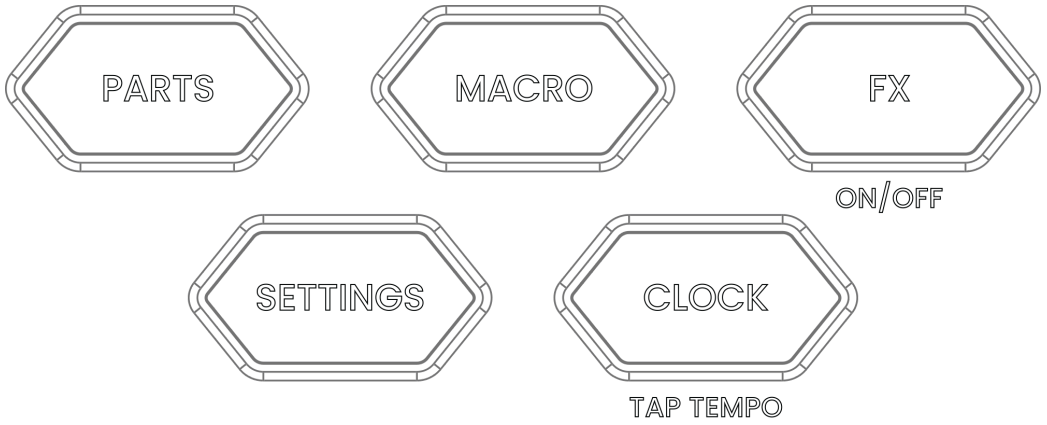
This page has no Soft Knob parameters.

Practical ideas for MIDI modulations:

- Rhythmic expression - Use **[MIDI]** mod source (CC74) for controlling the filter **[CUTOFF]** mod with LFO
    - Hold **[LFO]** and **[MIDI]** while turning the **[CUTOFF]** to assign the modulation.
    - Set the LFO waveform to taste.
    - Lower the via value for “initial rhythmic feel” while CC74 is at minimum.

Global Grid

Global Grid has global controls that are not specific to part.



- The **[PARTS]** button controls parts voice assignment parameters.
- The **[MACRO]** button assigns global macros for the Soft Knobs.
- The **[FX]** button controls the Main Out DSP FX.
- The **[SETTINGS]** button adjusts global settings.
- The **[CLOCK]** button adjusts clock settings.

TIP:
Tap the **[CLOCK]** button while holding the **[SHIFT]** button to set the tap tempo.

Parts

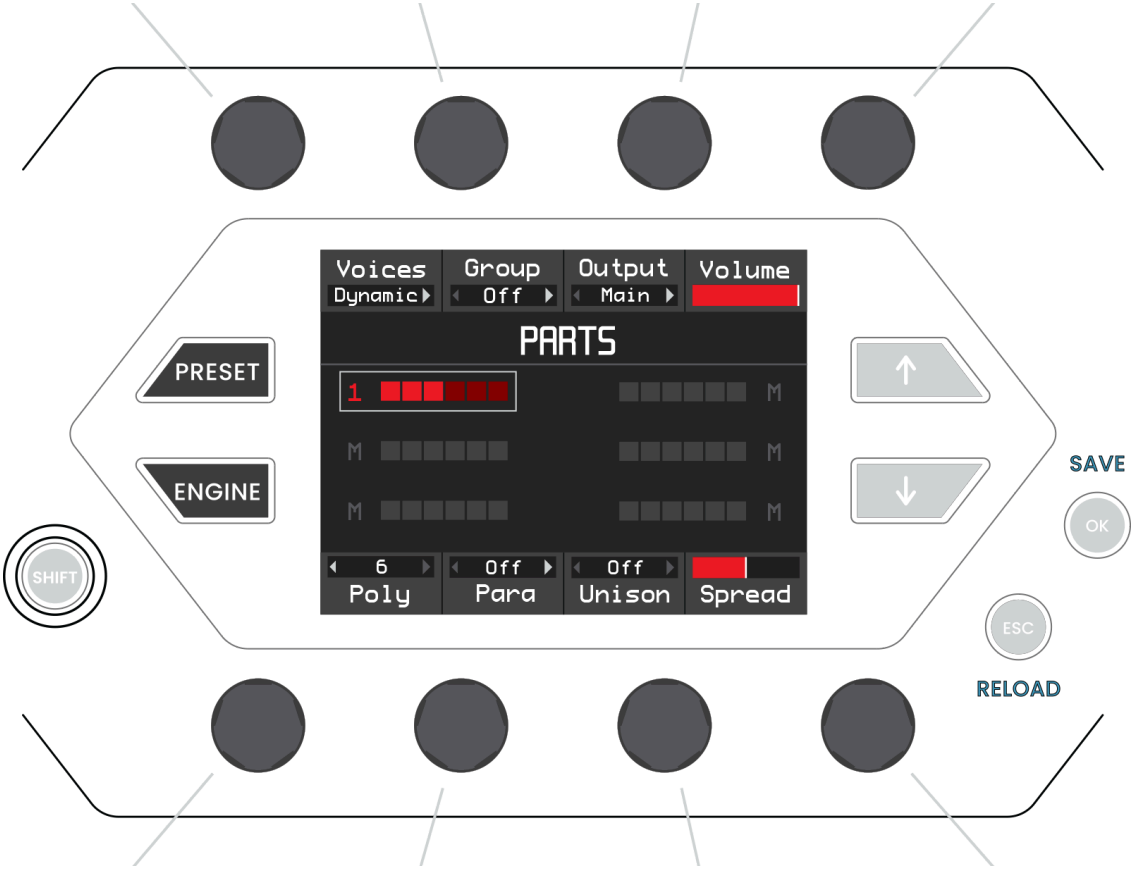
The Parts page displays the parameters specific to each part. Voice assignment of a part is controlled by three settings—Poly, Unison, and Para—which together determine how the Redshift 6 allocates its six available voices. When Unison mode is active, it includes a dedicated stereo pan Spread parameter.

‹Voices›
Voice allocation

‹Group›
Group of the Part

‹Output›
Part output

‹Volume›
Part volume



‹Poly›
Max number of voices

‹Para›
Max number of paraphony

‹Unison›
Number of voices per note

‹Spread›
Stereo panning of Unison voices

PARAMETER	VALUE	Description
‹Voices› Voice allocation	Dynamic, Reserved	Voice allocation setting of the part.
‹Group› Group of the Part	Off, A, B, C	Group of the Part.
‹Output› Part output	Main, Aux1, Aux2	Parts output.
‹Volume› Part volume	0% … 100%	Part volume.
‹Poly› Max number of voices	0, 1-6	Max number of polyphony.
‹Para› Max number of paraphony	Off, 2-5	Max number of paraphony.
‹Unison› Number of voices per note	Off, 2-6	Voices per note.
‹Spread› Stereo panning of Unison voices	0% … 100%	Stereo Spread of Unison voices.

‹Voices›
The six voices in Redshift 6 are dynamically allocated across all parts, allowing each of the six parts to use up to six voices—though not all at once. If more than six voices are needed simultaneously, voice stealing will occur. To prevent this, a part can reserve one or more voices, ensuring they are exclusively used by that part. The trade-off is that reserving voices reduces the number available to other parts.

‹Group›
Parts can be assigned to a Group (A, B, or C), allowing them to be triggered simultaneously from a single MIDI channel—useful for creating layered sounds or key splits. MIDI channel assignments for each group can be configured in the **[SETTINGS]** page.

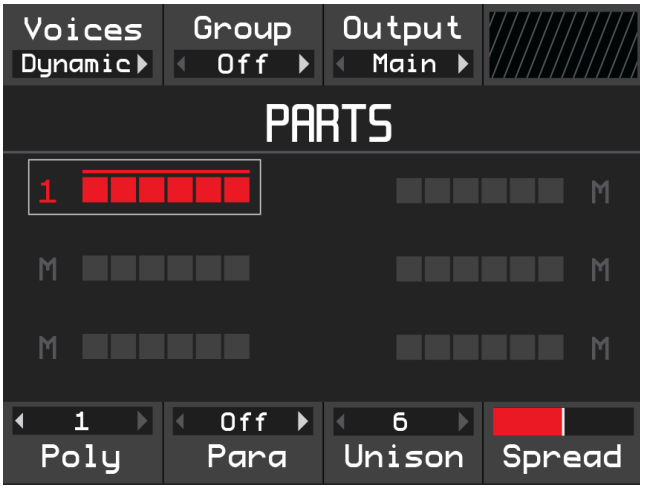
‹Output›
Each part can be individually assigned to one of the available stereo outputs: Main Out, Aux Out 1, or Aux Out 2. Using each part's pan control, it is possible to route all six voices to separate outputs or any other combination of the six outputs. The internal effects [FX] are only available from Main Out (not yet implemented).

‹Spread›
When Unison mode is active, the Spread parameter controls the stereo panning of the voices. **NOTE**: paraphonically played oscillators cannot be individually panned, only voices.

Assigning Unison Mode

All Redshift 6's six voices can be triggered with a single note in Unison mode to create a wall of sound, spread in the stereo field.

The amount of the voices playing in unison is selected by the **<Unison>** Soft Knob.



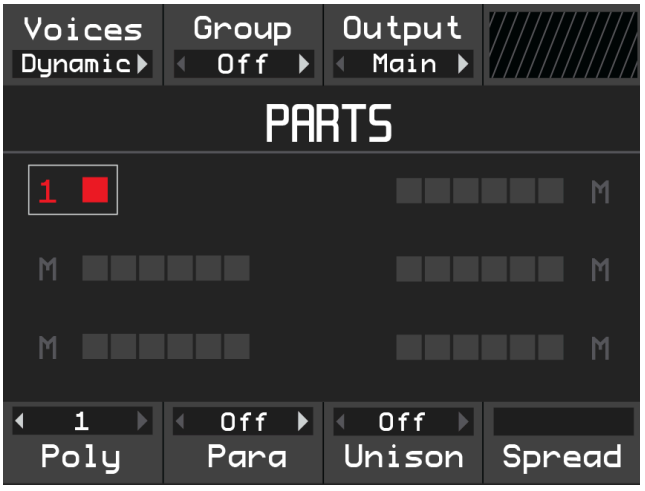
NOTE:
Unison limits polyphony. For 6-voice unison, polyphony must be set to 1 with the **<Poly>** Soft Knob.

TIP:
To play voices with stereo panning, set **<Poly>** to 3 or less, and the **<Unison>** to 2 or more, and adjust the stereo width with the **<Spread>** Soft Knob.

Assigning Mono Mode

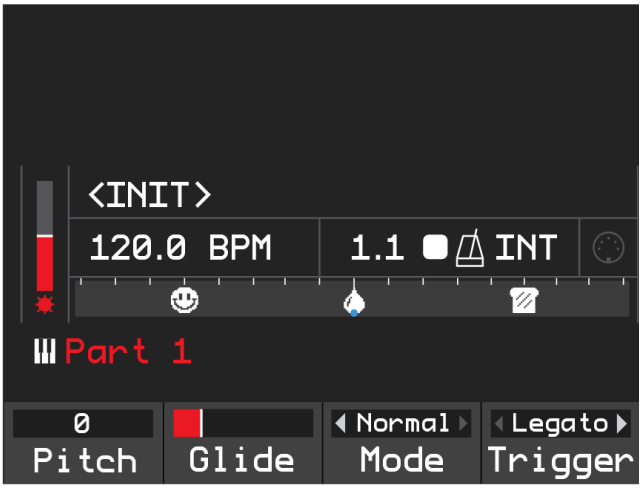
Legato triggering mode can be assigned to create classic monophonic analog synth sounds for lead melodies and bass parts.

When playing monophonic sounds, the voice allocation is set to play only one voice by turning maximum polyphony to 1 with the **<Poly >** Soft Knob.



TIP: for monophonic parts, increasing the **[DRIVE]** can produce a more aggressive tone.

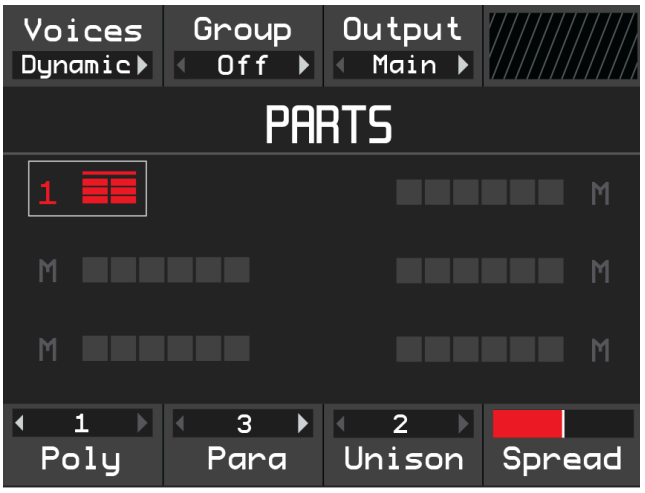
The envelope trigger mode can be set to either Retrig or Legato with the **<Trigger>** Soft Knob on the **[PERFORM]** page.



Assigning Paraphonic Mode

Paraphonic mode can be used to create vintage string machine-type sounds.

The max amount of the paraphony is selected by the **<Para>** Soft Knob.



NOTE:
The DCO **<Stack>** size limits the number of paraphony. **DCO ENV** will shape the amplitude of each paraphonic oscillator.

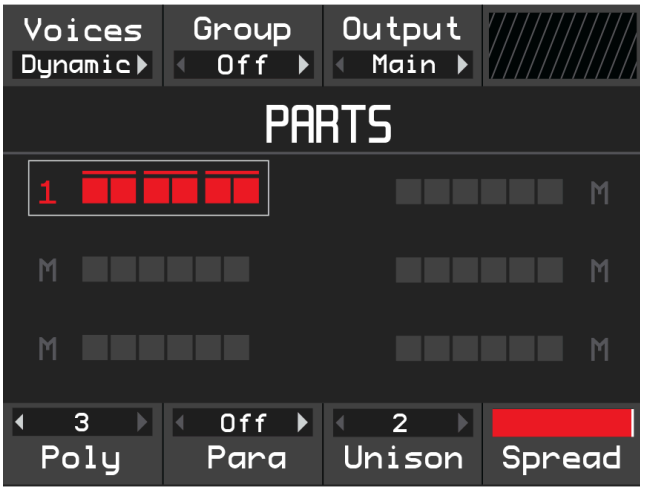
TIP:
To play voices with stereo panning, set the **<Unison>** to 2 or more, and adjust the stereo width with the **<Spread>** Soft Knob.

TIP: Try Paraphonic mode with the Drive set relatively high for aggressive electric guitar-style sounds. The main difference between Poly mode and Paraphony mode is that in Paraphony mode there is only one overdrive stage for multiple notes.

Assigning True-Stereo Poly Mode

A combination of **<Poly>** and **<Unison>** values can be used to create true stereo polyphonic sounds.

The max amount of polyphony selected by the **<Poly>** Soft Knob.



NOTE:
The unison limits the polyphony. For 2-voice unison, the polyphony must be set to 3 with the **<Poly>** Soft Knob.

TIP:
To play with stereo panning, adjust the stereo width with the **<Spread>** Soft Knob.

Macro

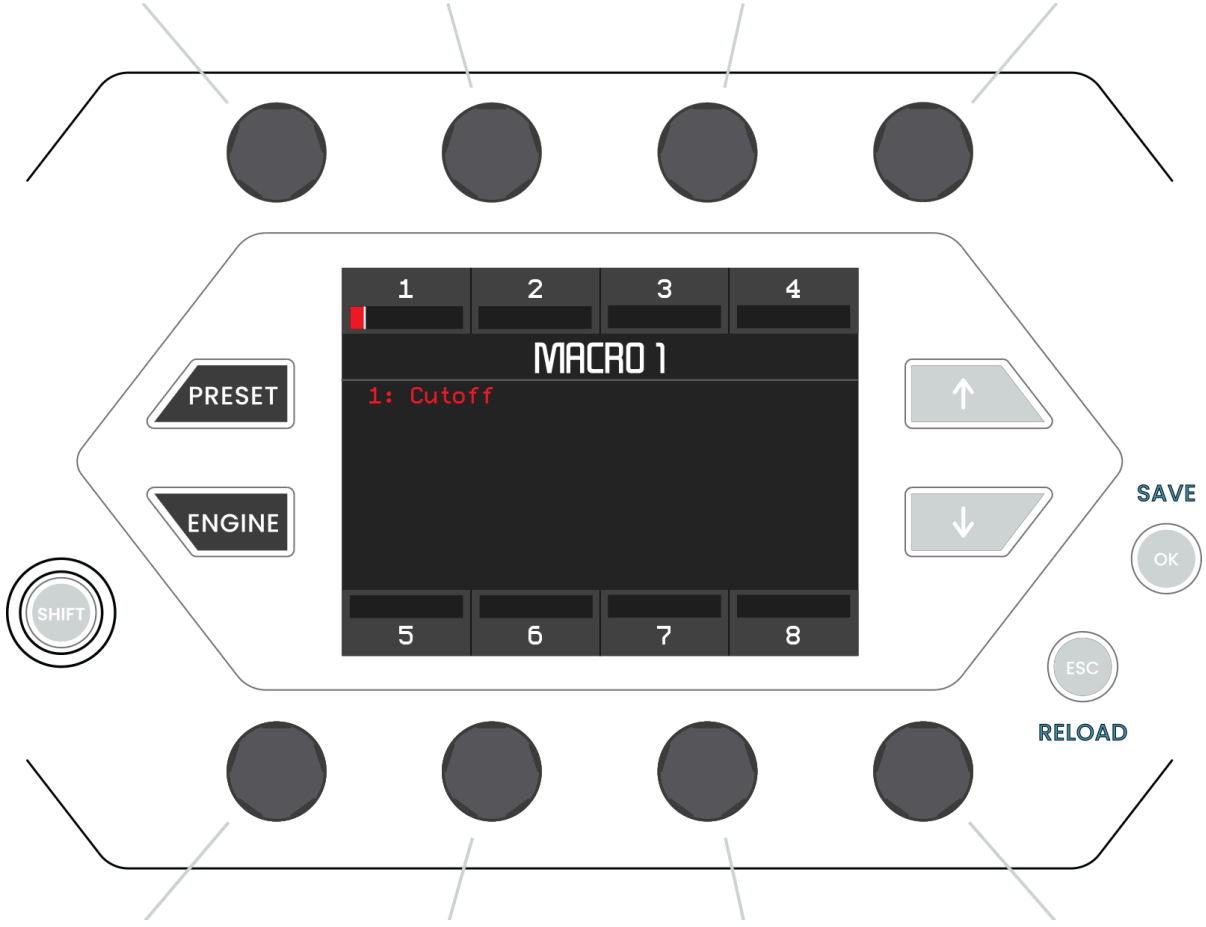
The Macros page includes eight assignable Macro controls. Each Macro can affect multiple parameters across different parts at once, allowing complex changes from a single control. Macros 1–8 are shared modulation sources for all parts. The selected Macro shows its routings on the screen.

‹1›
Macro 1

‹2›
Macro 2

‹3›
Macro 3

‹4›
Macro 4



‹5›
Macro 5

‹6›
Macro 6

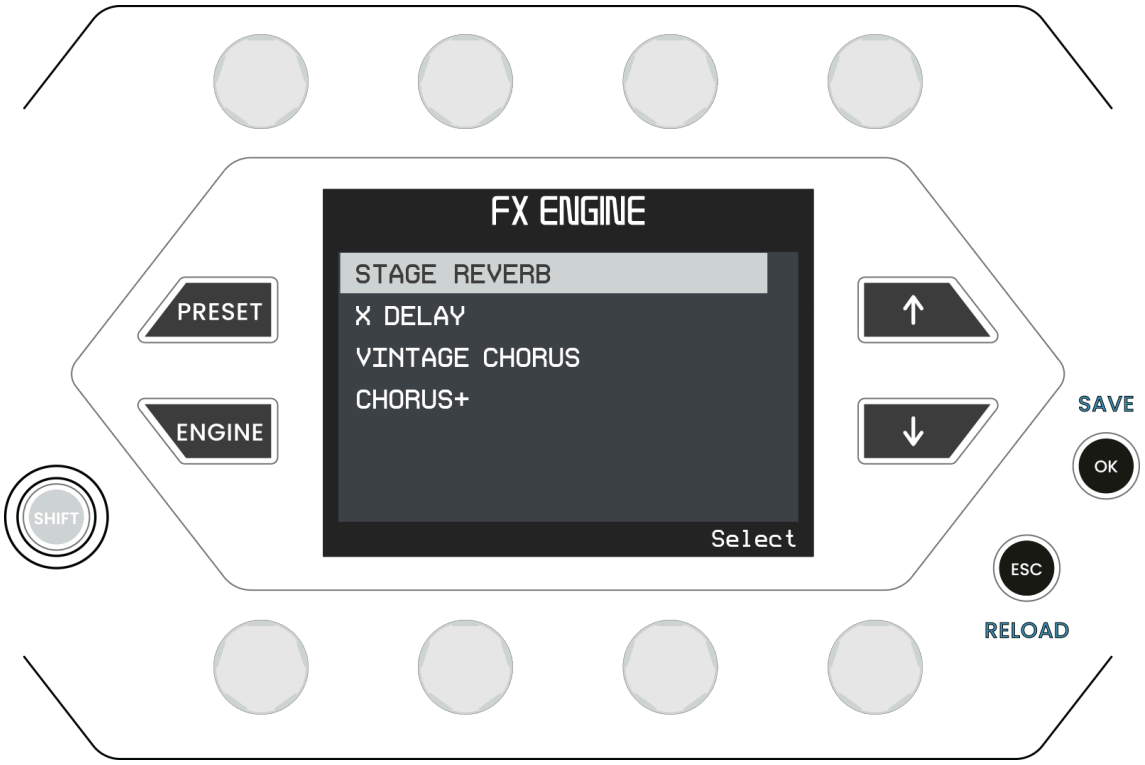
‹7›
Macro 7

‹8›
Macro 8

PARAMETER	VALUE	Description
‹1› … ‹8›	0% … 100%	Macro 1…8 value adjustment

FX

The different engines of the FX section add spaciousness, movement, and depth to the sound using high-quality DSP-based effects. When enabled, these effects are applied to all parts assigned to the stereo Main Out, while the parts assigned to the Aux 1 and Aux 2 stereo outputs remain fully dry and preserve an analog signal path at all times.



FX ENGINES:

Name	Description
STAGE REVERB	Simulates spaces from small rooms to large halls. Vintage Chorus can be enabled for added coloration.
X-DELAY	Stereo delay with sequential echo processing for rhythmic or atmospheric effects. Operates free-running or synced to an internal/external MIDI clock. Vintage Chorus can be enabled for added coloration.
VINTAGE CHORUS	Classic analog-style modulation with three modes (I, II, I+II). Adds width and movement.

Name	Description
CHORUS+	Stereo chorus that ranges from subtle thickening to more extreme modulation.

The FX engines operate in two configurations:

- Insert
    - The entire signal passes through the DSP.
- Side-chain mode
    - The original analog signal remains untouched, and the DSP-processed signal is mixed on top.

This parameter is predeterminated by the selected FX engine and is not user-definable.

Press **[SHIFT] + [FX]** (or double tap the **[FX]** button) to toggle the FXs on or off.

FX: STAGE REVERB

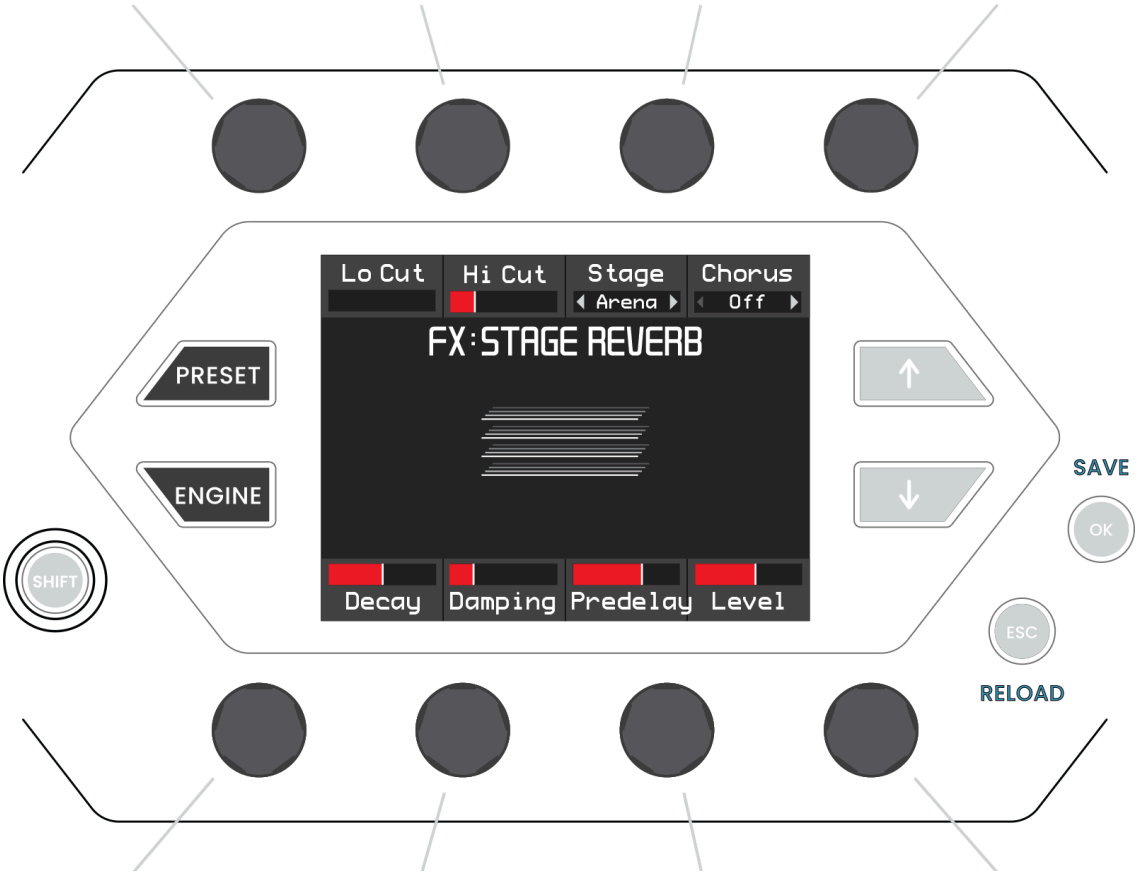
Stage Reverb places your sounds in a stage for performance, from the claustrophobic Shower or the subtle presence of Club to the long cinematic tails of the whole Cosmos. Sculpt the sound with different parameters, and layer it with Vintage Chorus for even more character.

‹Lo Cut›
Low-Frequency cut amount

‹Hi Cut›
High-Frequency cut amount

‹Stage›
Reverb type

‹Chorus›
Chorus type



‹Decay›
Reverb decay time

‹Damping›
High Frequency absorption

‹Predelay›
Pre-delay time

‹Level›
Reverb level

Parameter	Value	Description
‹Lo Cut› Low-Frequency cut amount	0% … 100%	Cuts the amount of low-frequency content that enters the reverb.
‹Hi Cut› High-Frequency cut amount	0% … 100%	Cuts the amount of high-frequency content that enters the reverb.
‹Stage› Reverb type	Shower Club Arena Canyon Cosmos	Sets the size of the space. Larger spaces have more internal modulation.
‹Chorus› Chorus type	Off, I, II, I+II	Selects the Vintage Chorus mode.
‹Decay› Reverb decay time	0% … 100%	The time it takes for the reverberated sound to fade away to silence. Maximum decay time depends on the selected **‹Stage›** mode: Shower - 1,25 sec Club - 2,5 sec Arena - 10 sec Canyon - 50 sec Cosmos - 100 sec
‹Damping› High Frequency absorption	0% … 100%	Controls how quickly high frequencies fade out in the reverb tail.
‹Predelay› Pre-delay time	1ms … 200ms	Sets the amount of time between the dry sound and when the reverb begins.
‹Level› Reverb level	0% … 100%	Sets the amount of reverb signal mixed with the analog signal.

NOTE: This FX engine operates in side-chain mode: The original analog signal remains untouched, and the DSP-processed signal is mixed on top.

FX: X-DELAY

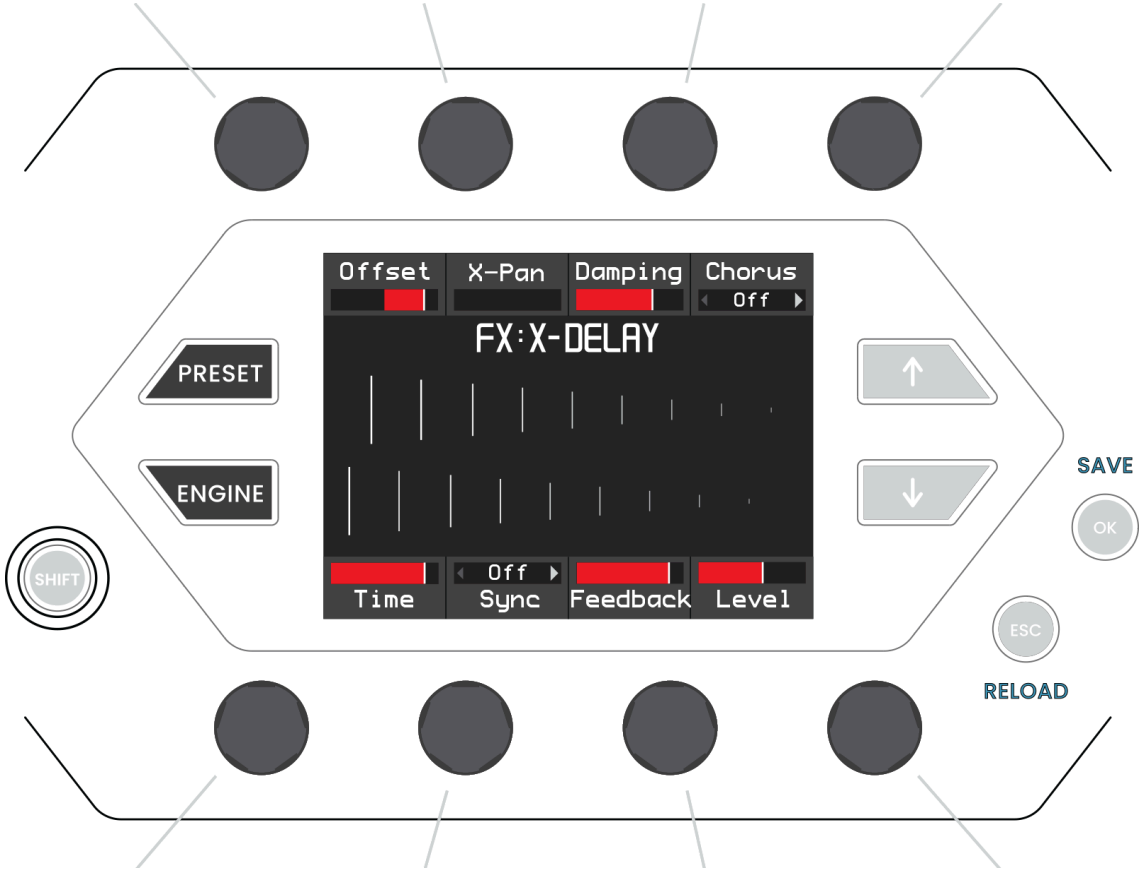
X-Delay is a stereo delay designed to create dynamic sequences of repeats that add rhythm, depth, and motion to your sound. It can produce anything from precise, tempo-synced patterns to free-running, atmospheric textures, and can run freely or lock to an internal or external MIDI clock for perfectly timed delays.

‹Offset›
L&R channel timing offset

‹X-Pan›
Delay stereo placement

‹Damping›
High frequency damping

‹Chorus›
Chorus type



‹Time›
Delay time

‹Sync›
Tempo sync

‹Feedback›
Delay feedback

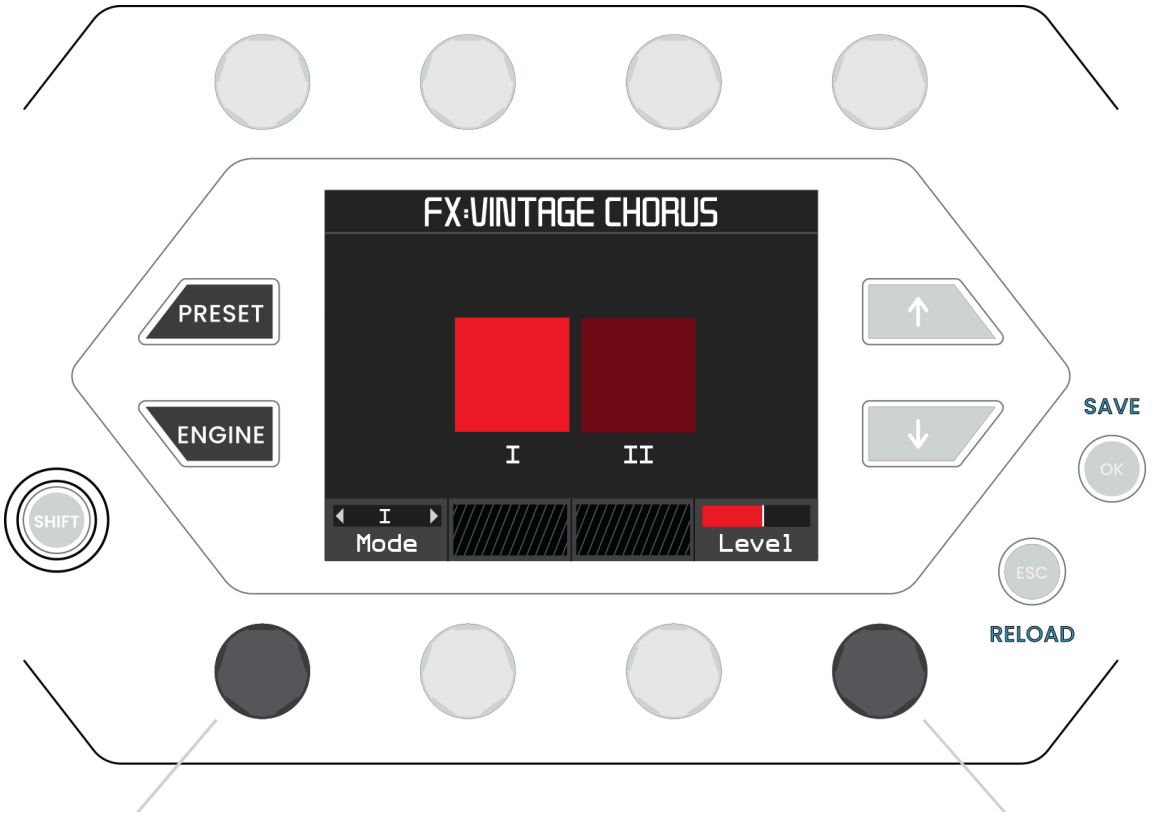
‹Level›
Overall FX level

Parameter	Value	Description
‹Offset› L&R channel timing offset	-50% … +50%	Timing offset changes the timing of the Left and Right delay lines (maximum setting: +/- 100ms).
‹X-Pan› Delay stereo placement	-100% … +100%	Stereo placement of alternating repeats, where values away from the center increase right-to-left or left-to-right movement.
‹Damping› High frequency damping	0% … 100%	Reduces high frequencies on each repeat, simulating natural decay.
‹Chorus› Chorus type	Off, I, II, I+II	Selects the Vintage Chorus mode.
‹Time› Delay time	4ms … 1000ms	Sets the delay time in milliseconds when operating freely; when **‹Sync›** is enabled, **‹Time›** is expressed as note divisions.
‹Sync› Tempo sync	Off, On	Enables tempo-based delay times using an internal or external clock.
‹Feedback› Delay feedback	0% … 100%	Controls how many delay repeats occur; higher values create longer tails.
‹Level› Overall FX level	0% … 100%	Overall output level of the X-Delay effect.

NOTE: This FX engine operates in side-chain mode: The original analog signal remains untouched, and the DSP-processed signal is mixed on top.

FX: VINTAGE CHORUS

The Vintage Chorus engine adds depth and movement through gentle pitch and delay modulation, creating the impression of multiple voices playing in unison. Its intentionally simple design offers three modes—I, II, and I+II—each providing a distinct, fixed balance of width and intensity inspired by that legendary analog synth chorus. It excels on simple brass, pads, strings, and sustained sounds, adding body and spaciousness while preserving a natural, musical character.



‹Mode›
Chorus type

‹Level›
Wet Level

Parameter	Value	Description
‹Mode› Chorus type	I, II, I+II	Selects the Chorus type.
‹Level› Wet level	0% … +100%	Wet signal level.

NOTE: This FX engine operates in side-chain mode: The original analog signal remains untouched, and the DSP-processed signal is mixed on top, with level settings modeled according to the vintage effect when **‹Level›** is set to max value.

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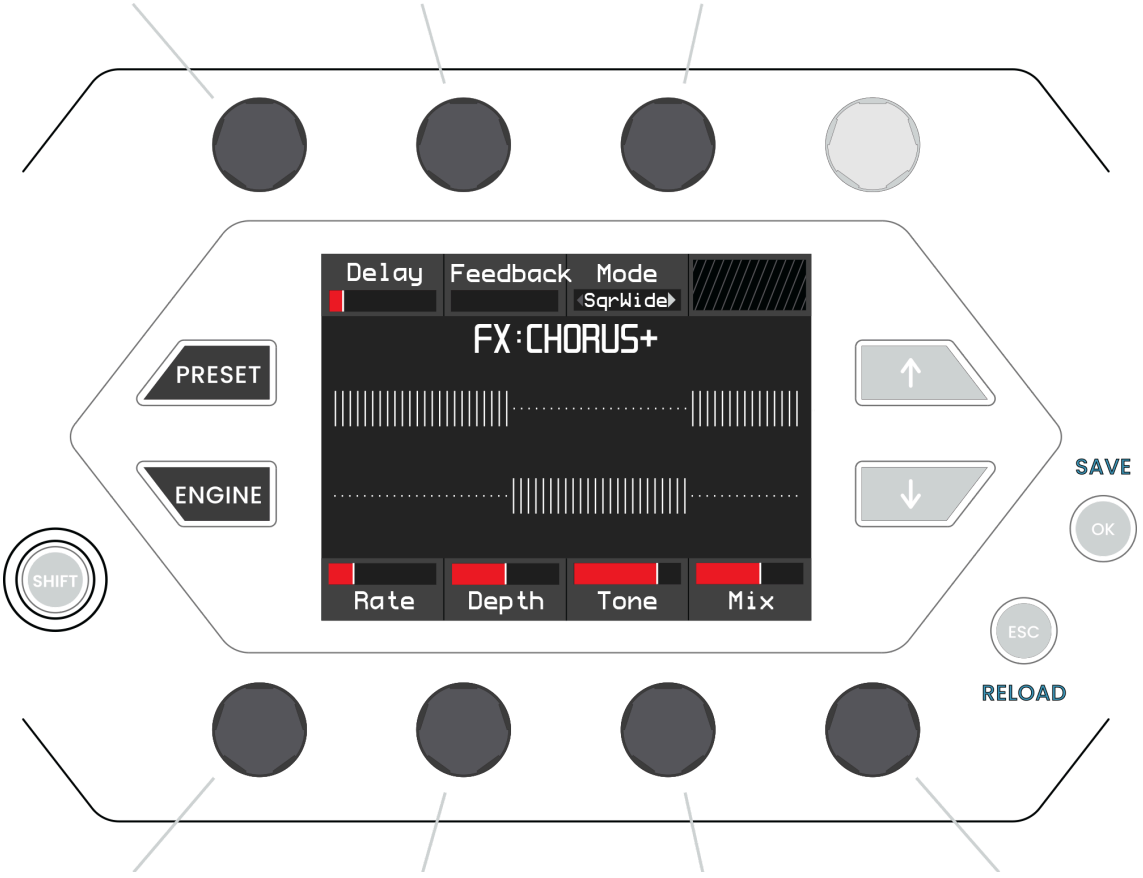
FX: CHORUS+

Chorus+ is a stereo modulation effect that thickens and widens the sound by mixing the original signal with a delayed, pitch-modulated version. While it can provide subtle doubling or a classic chorus effect, its adjustable parameters also allow for more extreme effects.

‹Delay›
Delay time

‹Feedback›
Feedback level

‹Mode›
Chorus waveform



‹Rate›
Chorus LFO Rate

‹Depth›
Chorus Depth

‹Tone›
Chorus brightness

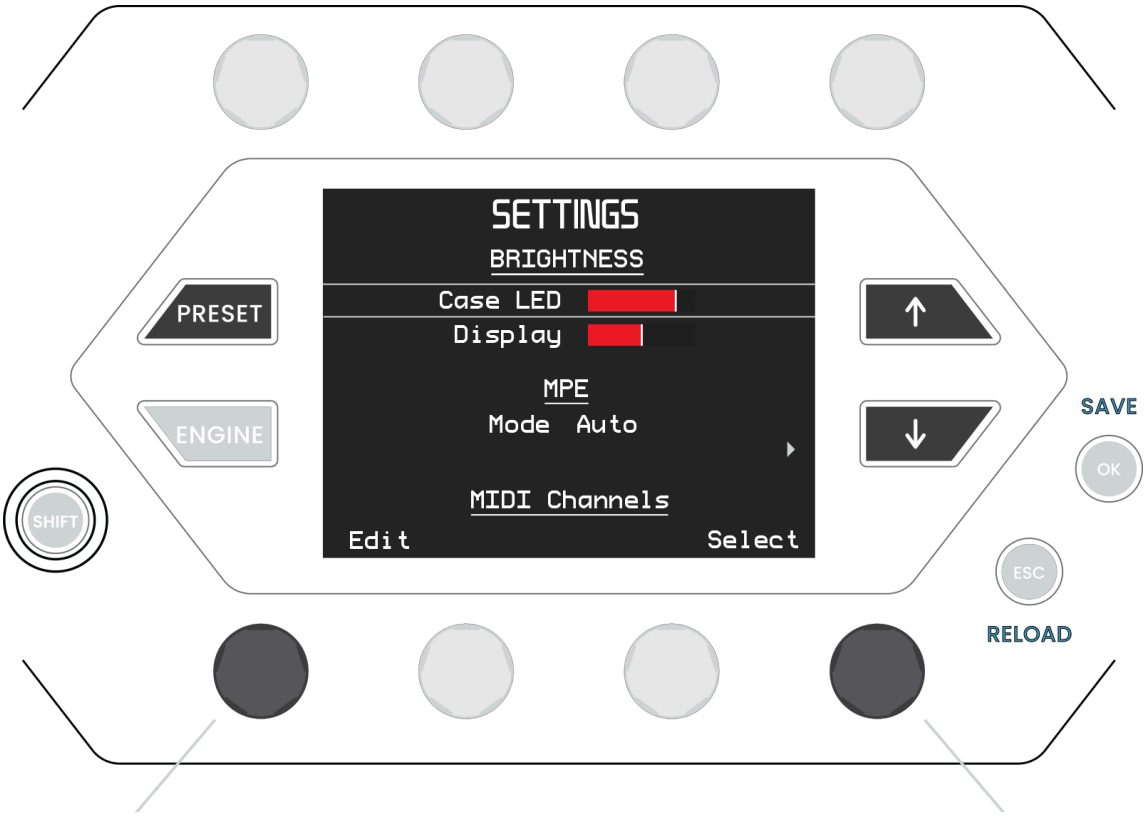
‹Mix›
Dry/Wet mix

Parameter	Value	Description
‹Delay› Delay time	1ms … 45ms	Base delay time that the modulation sweeps around; shapes the overall chorus character.
‹Feedback› Feedback level	0% … 100%	Feeds part of the processed output back into the effect, increasing intensity and resonance.
‹Mode› Chorus waveform	SqrWide SinWide Sqr Sin	Selects the chorus waveform variant, affecting modulation style and stereo behavior.
‹Rate› Chorus LFO Rate	0.01Hz … 2kHz	Speed of the delay-time modulation.
‹Depth› Chorus Depth	0 … 50 cent	Amount of modulation applied; higher values create stronger detuning and movement.
‹Tone› Chorus brightness	0% … 100%	Adjusts the brightness of the processed signal, from warm and dark to bright and present.
‹Mix› Dry/Wet mix	0% … 100%	Blend between the dry signal and the modulated chorus effect.

NOTE: This FX engine operates in insert mode: The entire signal passes through the DSP.

Settings

The Settings page shows the global settings, which are not stored in a preset. These include Case LED and Display brightness, Midi Channel settings for Perform channel, Parts 1-6, Groups A-C, and MIDI Sync.



‹Edit›
Edit selected parameter

‹Select›
Select a parameter for editing

Brightness

Parameter	Value	Description
‹Case LED›	0% … 100%	Adjust the brightness of the side panel LED located inside the Redshift 6 enclosure.
‹Display›	0% … 100%	Adjust the display brightness.

MPE Mode

Parameter	Value	Description
‹Mode›	Auto, Manual, Off	MPE Mode

MPE **‹Mode›** “Manual” has the following settings:

Parameter	Value	Description
‹Note Channels›	1-15	Sets the number of note channels, starting with MIDI channel 2.
‹Main PB Range›	+-1 … 12, +-24, +-48, +-96	Sets the main channel Pitch Bend range.
‹Note PB Range›	+-1 … 12, +-24, +-48, +-96	Sets the note channel Pitch Bend range.

MIDI Channels

Parameter	Value	Description
<Perform>	OFF, 1-16	Perform Midi Channel (Default: 1)
<Part 1>	OFF, 1-16	Part 1 Midi Channel (Default: 2)
<Part 2>	OFF, 1-16	Part 2 Midi Channel (Default: 3)
<Part 3>	OFF, 1-16	Part 3 Midi Channel (Default: 4)
<Part 4>	OFF, 1-16	Part 4 Midi Channel (Default: 5)
<Part 5>	OFF, 1-16	Part 5 Midi Channel (Default: 6)
<Part 6>	OFF, 1-16	Part 6 Midi Channel (Default: 7)
<Group A>	OFF, 1-16	Group A Midi Channel (Default: 8)
<Group B>	OFF, 1-16	Group B Midi Channel (Default: 9)
<Group C>	OFF, 1-16	Group C Midi Channel (Default: 10)

Perform
The Perform MIDI Channel routes incoming MIDI messages to the currently selected part. If that part is assigned to a Group (A–C), all parts within the same Group will respond and play together. Note that Control Change (CC) and Non-Registered Parameter Number (NRPN) MIDI messages are sent only to the currently selected part, but the unselected parts sharing the same Group will receive Channel and Poly Aftertouch, ModWheel (CC#1), and Sustain (CC#64).

Part 1-6
Each of the six parts can be assigned a dedicated MIDI channel, making this configuration ideal for use with a Digital Audio Workstation (DAW) or an external MIDI controller. Both CC and NRPN MIDI messages are accepted on these channels.

Group A-C
Parts can be assigned to a Group (**<Group>** soft knob at **[PARTS]**) and all assigned parts will receive MIDI from Group A-C MIDI channel. Both CC and NRPN MIDI messages

are ignored on these channels (excluding Channel and Poly Aftertouch, ModWheel (CC#1), and Sustain (CC#64)).
NOTE: If a MIDI channel is already assigned, its number will appear in red to indicate a conflict. All MIDI messages received on that channel will be ignored until the overlap is resolved.

NOTE: If MPE mode is set to Manual, Midi channels settings are disabled.

Sync

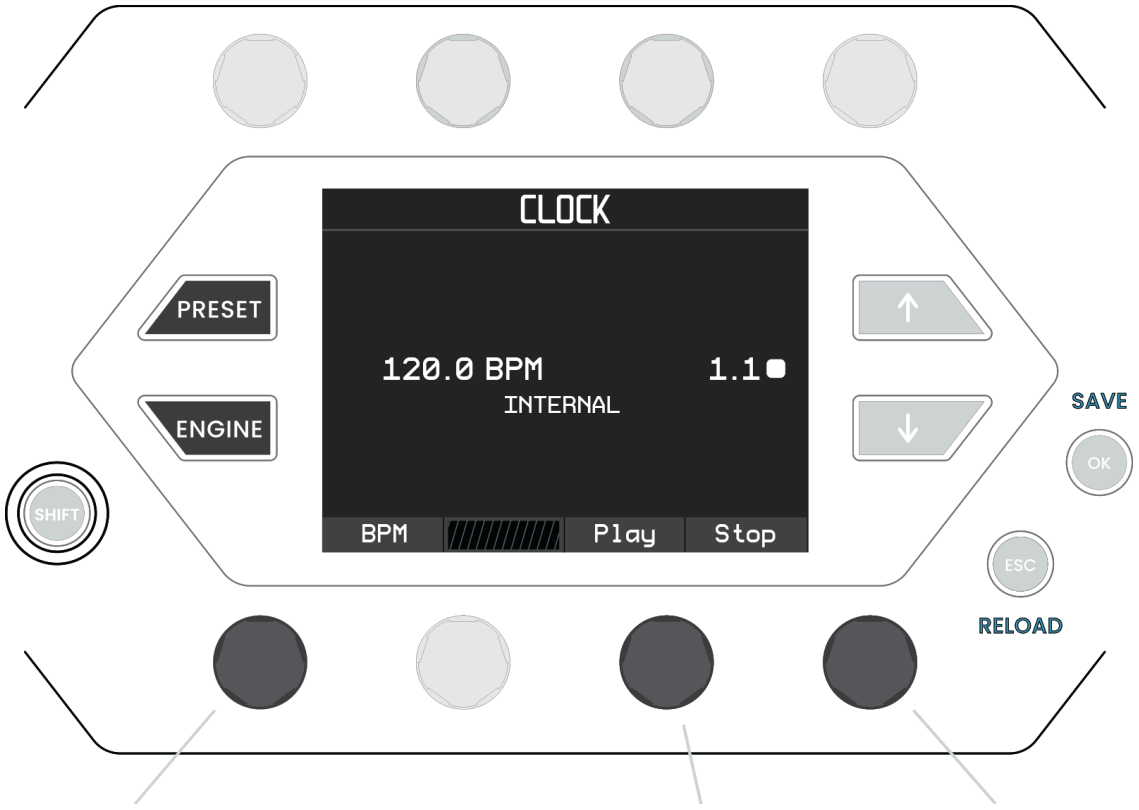
Parameter	Value	Description
<Clock>	Internal, Auto	Midi Clock source select: “Auto” mode will sync time-based events to an external MIDI Clock if available. “Internal” will ignore received MIDI Clock messages.

Tuning

Parameter	Value	Description
<Master Tune>	425.0Hz … 455.0Hz	Master tuning (default 440.0).

Clock

The Clock page displays the parameters that control the Redshift 6's Clock sync and global internal BPM tempo. Hold **[SHIFT]** while pressing **[CLOCK]** multiple times for Tap Tempo. The **[CLOCK]** LED indicates the current tempo.



‹BPM›
Tempo adjust

‹Play› / ‹Pause›
Transport control

‹Stop›
Transport control

Parameter	Value	Description
‹BPM›	10 … 250 BPM	Tempo adjustment (Beats Per Minute).
‹Play› / ‹Pause›	Play, Pause	Global transport control. Press Soft Knob to Play and Pause.
‹Stop›	Stop	Global transport control. Press Soft Knob to Stop and rewind to bar 1.1.

Clock modes:

Clock mode can be selected from the **[SETTINGS]**.

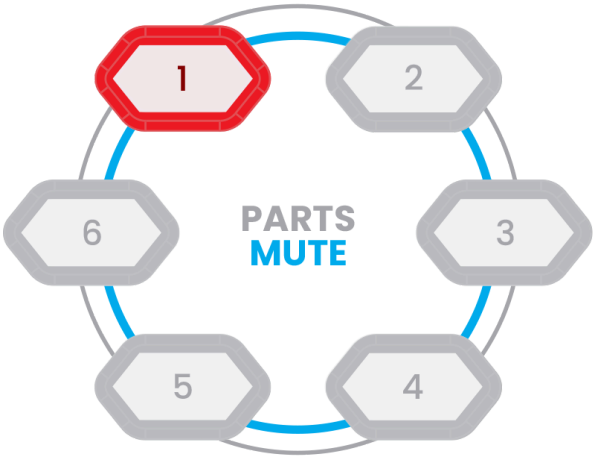
- Auto - External MIDI clock is used when received. If not, the internal clock is used.
- Internal - MIDI clock is disabled, using only the internal clock.

TIP:
Press and hold the **<BPM>** soft knob while turning it to adjust the value in increments of ten.

Parts Selector Grid

The Part Selector Grid allows you to navigate between different parts. Buttons 1–6 are used to select or mute individual parts, with their LEDs indicating the current status of each part. Each of the six available parts has its own distinct color scheme, which is reflected across all RGB LED buttons on the synth for clear visual feedback.

- The **[1] - [6]** button selects which part is currently active for editing.
- The **[1] - [6]** LEDs indicate the parts current status.



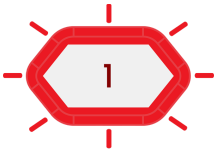
TIP:
Press the **[SHIFT] + [1]-[6]** (or double tap the **[1]-[6]**)buttons to mute or unmute a part.

The LEDs will blink to indicate when a part is playing—i.e., receiving MIDI Note On messages—except for parts that are muted.

TIP:
To initialize the currently selected part only, press **[SHIFT] + [PART]**.

LED indication descriptions

The LEDs in the Part Selector Grid reflect the current status of each part using various visual cues. These behaviors help the user navigate between parts and provide a clear sense of the overall system activity.

	LED fully off	unselected	muted	not playing
	LED breathing	selected	unmuted	not playing
	LED ON	selected	unmuted	playing
	LED dimly lit	unselected	unmuted	not playing
	LED blinking	selected	muted	not playing

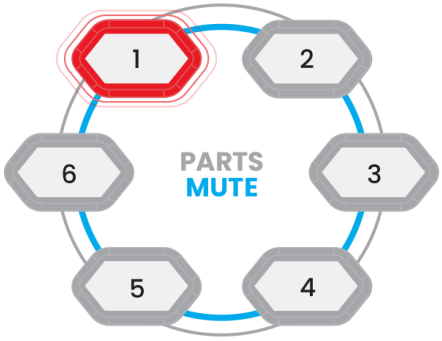
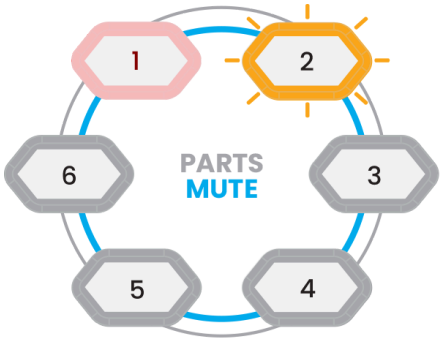
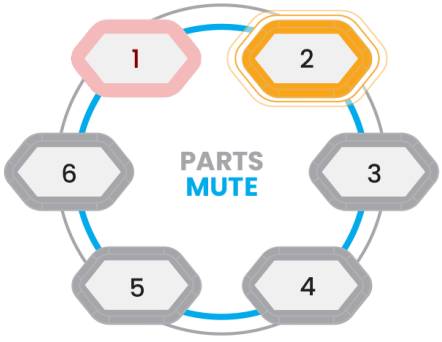
Editing multiple parts

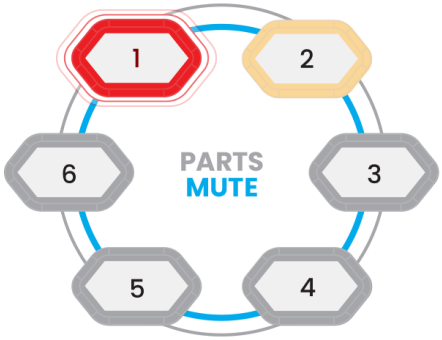
Pressing and holding multiple **buttons [1]-[6]** simultaneously edits all selected Parts, applying the same values to each Part.

TIP: To edit all Parts at once, you'd need to hold all six buttons while turning a knob — which can be tricky. Instead, press and hold one Part button, tap the other parts to latch them, and make the assignments / adjustments. When you release the originally held button, multi-edit mode ends.

Practical ideas for layering parts:

In this practical example start by initializing the preset and move on to programming a two part layer preset. Send MIDI note-on messages (=play the controller) to the Perform MIDI channel (default: 1).

	• Initialize preset: Press **[SHIFT] + [PERFORM]**. • Part **[1]** LED indicates "selected and unmuted" by "breathing" (slow fade in/out). • Program the part 1 to your liking.
	• Press **[2]**. • Part **[2]** LED indicates "selected and muted" by blinking. • Press **[2]** again (or **[SHIFT] + [2]**) to unmute the part.
	• Part **[2]** LED indicates "selected and unmuted" by "breathing" (slow fade in/out). • Program the part 2 to your liking. • Use **[1]** and **[2]** to switch between parts, and **[SHIFT] +[1]** or **[2]** to mute and unmute parts while editing.

	• For layering parts: Add both parts to Group A. ○ Use the **‹Group›** soft knob at **[PARTS]** screen and select “Group A” for part 1 and part 2. • Both parts play simultaneously when sending MIDI note-on messages to the Perform MIDI channel (while part 1 or 2 is selected) or to the Group A MIDI channel. • Use **‹Low›** and **‹High›** soft knobs at the **[KEY]** screen to adjust MIDI note limits for splits.

Updating the Firmware

The latest version of the firmware can be downloaded from Supercritical's **website**.

NOTE:
Before updating, check the current firmware version of your Redshift 6 at the **[Settings]** page.

Update process

1. Power off the Redshift 6.
2. Connect the supplied USB cable between your computer's USB port and the Redshift 6's USB port.
3. Power on the Redshift 6.
4. Open the Redshift 6 Updater on your computer and click **Start**.
5. When the updater screen displays "All done, bleep away!", the update process is complete.
6. Enjoy the newly updated firmware!

APPENDIX-A: Preset list

Preset Name	Created by
MT SUPER POLY	Supercritical
ARENA SAWS	Supercritical
MT LUNAR CLOCKWORK	Supercritical
IN AN EVIL PHASE	Supercritical
MT UNISON DCO ECHOES	Supercritical.
ARP STRING QUARTET	Supercritical
MT TOM SOURER SPLIT	Supercritical
FOR TOM AND EDDIE	Supercritical
PAD FOR SALE	Supercritical
NEW TINES	Supercritical
ARP PACIFIC RAINDROP	Supercritical
PLANETARY STRINGS	Supercritical
ARP ZERO SUM	Supercritical
LOST IN 106 PARCECS	Supercritical
ANGRY ROCKET SHIP	Supercritical
ARP EUPHORIC SAWS	Supercritical
90 TO THE METAL	Supercritical
ARP BEYOND SUNSET	Supercritical
LEVITATE PAD	Supercritical
PARA SAMPLE AND HOLD	Supercritical
ARP SYNTHCAST NEWS	Supercritical
MT POLARIS SPLIT	Supercritical.
ARP CLUB HELSINKI	Supercritical
PARAPHASE ENSEMBLE	Supercritical
MT SOLITUDE	Supercritical
AGING POLY LEGEND	Supercritical
ARCHIPELAGO MIST	Supercritical
SOUNDSCAPE	Supercritical
MT ASTRO CRUISER	Supercritical
106 CHORUS STRINGS	Supercritical
ETHEREAL PAD	Supercritical
MT POLYBRASS SPLIT	Supercritical
MT SPACE CATHEDRAL	Supercritical
MT SIX VOICE MONO	Supercritical
CHORUS STRINGMACHINE	Supercritical

Preset Name	Created by
MOLOKO PIPES	Supercritical
ARP CLUB TAMPERE	Supercritical
MT SUPERSAW SEQUENCE	Supercritical
MT PHASE DIST PLUCK	Supercritical
MT TRANQUILITY	Supercritical
MT SLIPPY STABS	Supercritical
ARP CLUB TURKU	Supercritical
80S POLYSAW	Supercritical
ARP STEREO SUPERSAWS	Supercritical
INTERSTELLAR DEBRIS	Supercritical
ARP CORE BREACH	Supercritical
DUSTY DCO ECHOES	Supercritical
MT AMBIENT SKIES	Supercritical
MT DRIVEN LFO PLUCK	Supercritical
MT SYNCED SAW PAD	Supercritical
HUMANA AFTER ALL	Supercritical
SEQ TRANCE BUILD UP	Supercritical
SEQ DIVIDING SPACES	Supercritical
SEQ RITUAL LOOP	Supercritical
SEQ DESCENDING DUSK	Supercritical
SEQ CLEAR WATERS	Supercritical
SEQ DUB CHORDS	Supercritical
SEQ BASS N CHORDS	Supercritical
SEQ SATURATED ECHOES	Supercritical
MATH TRACKING REZPAD	Supercritical
MATH OVERDRIVEN 7THS	Supercritical
MATH LFO RHYTHM PAD	Supercritical
MATH CURVE SWEEP PAD	Supercritical
MATH CURIOUS DROID	Supercritical
MPE DREAMS	Supercritical
MPE SUB ZERO	Supercritical
MT PHASE HERO	Supercritical
ARP CLUB SEINAJOKI	Supercritical
MT RAVE O MATIC	Supercritical
ARP DETUNE RIOT	Supercritical
SUPER PLUCK PAD	Supercritical
CROAK A LICIOUS	Supercritical
STEREO UNIBASS	Supercritical

Preset Name	Created by
TRANSISTOR ORGAN	Supercritical
SUPER POLY	Supercritical
RHYTHMIC FIFTHS	Supercritical
RAVE UNISON	Supercritical
PULSATILE REZ PAD	Supercritical
ANTHEM BRASS	Supercritical
PARAPHONIC DRIVE	Supercritical
WORN STRING MACHINE	Supercritical
VELOBASS	Supercritical
RESO UNISON SWEEP	Supercritical
BON VOYAGER	Supercritical
VINTAGE LEAD	Supercritical
POLY BRASS	Supercritical
SWEEP MOVER	Supercritical
MT DAS BOOT	Supercritical
VINTAGE STRINGS	Supercritical
MUTED GUITAR	Supercritical
STEREO UNIBASS	Supercritical
80S POLYPWM	Kebu
BETTE DAVIES EYES	Kebu
DCO ENV LEAD	Kebu
JUNE HARP	Kebu
PARAPHONIC STAB	Kebu
PARACHORDS STAB	Kebu
SUPERSAW AT PLUCK	Kebu
SUPERMASSIVE	Gattobus
NEUTRINO PULSE	Gattobus
PARABOLIC DECAY	Gattobus
STRINGS THEORY	Gattobus
SYNCO WAVES	Gattobus
SUBATOMIC BASS	Gattobus
MULTI DIM SWEEP	Gattobus
PURE JUNE	Gattobus
808 LEAD	Starsky Carr

Preset Name	Created by
ACID BASS	Starsky Carr
ACID BASS 2	Starsky Carr
ARP1	Starsky Carr
ARP2	Starsky Carr
ARP3	Starsky Carr
BRASSY 5TH	Starsky Carr
BRASSY PAD	Starsky Carr
BROKEN PLUCK	Starsky Carr
CLASSIC	Starsky Carr
CRIPS PAD	Starsky Carr
DIRTY MOON	Starsky Carr
DIRTY VIBE	Starsky Carr
ELEC BASS	Starsky Carr
ELEC PIANO	Starsky Carr
FALLING BELL	Starsky Carr
FAUX REV ECHO	Starsky Carr
HARMONICS	Starsky Carr
HOOVERISH	Starsky Carr
INHARMONIC CLANGS	Starsky Carr
LOFI ORGAN	Starsky Carr
MOD PAD	Starsky Carr
OCT LEAD	Starsky Carr
OCTAVE BASS	Starsky Carr
ONLY LEAD	Starsky Carr
POLY 1	Starsky Carr
POLY 2	Starsky Carr
P5 BASS	Starsky Carr
PW CHILLC	Starsky Carr
PWM BASS	Starsky Carr
PWM PAD	Starsky Carr
PWM PAD 2	Starsky Carr
PWM PAD 3	Starsky Carr
REESE BASS	Starsky Carr
RELEASE REZ	Starsky Carr

Preset Name	Created by
RESO DROP	Starsky Carr
RISER	Starsky Carr
SAW BASS	Starsky Carr
SEQ BASS	Starsky Carr
SEQ BASS 2	Starsky Carr
SOFT 5TH	Starsky Carr
SOLID BASS	Starsky Carr
SPACE BELLS	Starsky Carr
SQ BASS	Starsky Carr
SYNTH BASS	Starsky Carr
SYNTH BASS 2	Starsky Carr
SYNTH HARP	Starsky Carr
THE MAJOR	Starsky Carr
THE MINOR	Starsky Carr
UNI STACK RATTLE	Starsky Carr

APPENDIX-B: Modulation sources

Mod Source	[Button]	Description
DCO Env	[DCO ENV]	DCO envelope
VCF Env	[VCF ENV]	VCF envelope
Amp Env	[AMP ENV]	AMP envelope
Aux Env	[AUX ENV]	Aux envelope
LFO 1	[LFO 1]	LFO 1
LFO 2	[LFO 2]	LFO 2
LFO 3	[LFO 3]	LFO 3
LFO 4	[LFO 4]	LFO 4
Vel	[VEL]	Note-on velocity
Off Vel	[VEL]+[↑]/[↓]	Note-off velocity
AT	[AT]	Channel and Polyphonic Aftertouch
Key	[KEY]	Key Follow
Gate	[GATE]	MIDI note-on = max, note-off = min
ModWheel	[WHEEL]	Modulation Wheel
PB	[WHEEL]+[↑]/[↓]	Pitch Wheel
VoiceIdx	[VOICE]	Min … Max value is equally divided by voices
VoiceAlt	[VOICE]+[↑]/[↓]	Min and Max value alternate within voices
VoiceRnd	[VOICE]+[↑]/[↓]	Random number for every voice
Uni Idx	[VOICE]+[↑]/[↓]	Min … Max value is equally divided by **<Unison>**

Mod Source	[Button]	Description
Uni Alt	[VOICE]+[↑]/[↓]	Min and Max value alternate within Unison
Poly Idx	[VOICE]+[↑]/[↓]	Min … Max value is equally divided by **<Poly>**
Poly Alt	[VOICE]+[↑]/[↓]	Min and Max value alternate within Poly
Note Rnd	[VOICE]+[↑]/[↓]	Random value with every note-on
CC74	[MIDI]	MPE Timbre (CC74)
ArpSeq	[Arp|Seq]	Arp: lowest … highest notes = 0 … 1, Seq: CV parameter value (bipolar)
Macro 1	[Macro]	Soft knob 1 on [Macro] page
Macro 2	[Macro]+[↑]/[↓]	Soft knob 2 on [Macro] page
Macro 3	[Macro]+[↑]/[↓]	Soft knob 3 on [Macro] page
Macro 4	[Macro]+[↑]/[↓]	Soft knob 4 on [Macro] page
Macro 5	[Macro]+[↑]/[↓]	Soft knob 5 on [Macro] page
Macro 6	[Macro]+[↑]/[↓]	Soft knob 6 on [Macro] page
Macro 7	[Macro]+[↑]/[↓]	Soft knob 7 on [Macro] page
Macro 8	[Macro]+[↑]/[↓]	Soft knob 8 on [Macro] page
Math 1	[Math 1]	Math 1
Math 2	[Math 2]+[↑]/[↓]	Math 2
Math 3	[Math 3]+[↑]/[↓]	Math 3
Math 4	[Math 4]+[↑]/[↓]	Math 4

Tip:
For understanding (unipolar) Voice/Unison/Poly Idx and Alt sources, in the following chart the Min value is equal to -1 and the Max value is equal to +1.

<Poly> = 3, <Unison> = 2

	Voice #1	Voice #2	Voice #3	Voice #4	Voice #5	Voice #6
VoiceIdx	-1	-0,6	-0,2	+0,2	+0,6	+1
VoiceAlt	-1	+1	-1	+1	-1	+1
Poly Idx	-1	-1	0	0	+1	+1
Poly Alt	-1	-1	+1	+1	-1	-1
Uni Idx	-1	+1	-1	+1	-1	+1
Uni Alt	-1	+1	-1	+1	-1	+1

<Poly> = 2, <Unison> = 3

	Voice #1	Voice #2	Voice #3	Voice #4	Voice #5	Voice #6
VoiceIdx	-1	-0,6	-0,2	+0,2	+0,6	+1
VoiceAlt	-1	+1	-1	+1	-1	+1
Poly Idx	-1	-1	-1	+1	+1	+1
Poly Alt	-1	-1	-1	+1	+1	+1
Uni Idx	-1	0	+1	-1	0	+1
Uni Alt	-1	+1	-1	-1	+1	-1

APPENDIX-C: Modulation destinations

Destination	Description
Aux Atk	<Atk> Soft Knob on [AUX ENV] page
Aux Dec	<Dec> Soft Knob on [AUX ENV] page
Aux Sus	<Sus> Soft Knob on [AUX ENV] page
Aux Rel	<Rel> Soft Knob on [AUX ENV] page
Cutoff	[CUTOFF] knob
Reso	[RESONANCE] knob
Mode	[MODE] knob
Separat	VCF: MIRROR TWINS engine's <Sep> Soft Knob on [VCF] page
Depth	VCF: MIRROR TWINS engine's <Depth> Soft Knob on [VCF] page
LFO 1 Hz	<Rate> Soft Knob on [LFO 1] page
LFO 2 Hz	<Rate> Soft Knob on [LFO 2] page
LFO 3 Hz	<Rate> Soft Knob on [LFO 3] page
LFO 4 Hz	<Rate> Soft Knob on [LFO 4] page
Tune2	<Tune2> Soft Knob on [DCO] page
Detune	[DETUNE] knob
Balance	[BALANCE] knob
Noise	<Noise> Soft Knob on [DCO] page
PW1	<PW 1> Soft Knob on [DCO] page
PW2	<PW 2> Soft Knob on [DCO] page
DCO Atk	<Atk> Soft Knob on [DCO ENV] page

Destination	Description
DCO Dec	<Dec> Soft Knob on [DCO ENV] page
DCO Sus	<Sus> Soft Knob on [DCO ENV] page
DCO Rel	<Rel> Soft Knob on [DCO ENV] page
Gain	<Gain> Soft Knob on [AMP] page
Pan	<Pan> Soft Knob on [AMP] page
Amp Atk	<Atk> Soft Knob on [AMP ENV] page
Amp Dec	<Dec> Soft Knob on [AMP ENV] page
Amp Sus	<Sus> Soft Knob on [AMP ENV] page
Amp Rel	<Rel> Soft Knob on [AMP ENV] page
VCF Atk	<Atk> Soft Knob on [VCF ENV] page
VCF Dec	<Dec> Soft Knob on [VCF ENV] page
VCF Sus	<Sus> Soft Knob on [VCF ENV] page
VCF Rel	<Rel> Soft Knob on [VCF ENV] page
Charactr	[CHARACTER] knob
Drive	[DRIVE] knob
Volume	<Volume> Soft Knob on [AMP] page
Pitch	<Pitch> Soft Knob on [PERFORM] page

APPENDIX-D: MIDI Implementation

MIDI CC & NRPN

Parameter	Type	CC	NRPN	MSB	LSB	NRPN range	CC range
Drive	Part	78	1	0	1	0 - 16383	0-127
Character	Part	70	2	0	2	0 - 16383	0-127
DCO: Osc 1 Wave	Part		128	1	0	0: Saw, 1: Pulse, 2: Saw R, 3: Pulse R, 4: None	0: Saw, 1: Pulse, 2: Saw R, 3: Pulse R, 4: None
DCO: Osc 2 Wave	Part		129	1	1	0: Saw, 1: Pulse, 2: Saw R, 3: Pulse R, 4: None	0: Saw, 1: Pulse, 2: Saw R, 3: Pulse R, 4: None
DCO: Osc 1 PW	Part		130	1	2	0 - 16383	0-127
DCO: Osc 2 PW	Part		131	1	3	0 - 16383	0-127
DCO: Osc 2 Tune	Part		132	1	4	0 - 16383	0-127
DCO: Stack	Part	75	133	1	5	1 - 8	1 - 8
DCO: Detune	Part	76	134	1	6	0 - 16383	0-127
DCO: Balance	Part	77	135	1	7	0 - 16383	0-127
DCO: Noise Level	Part		136	1	8	0 - 16383	0-127
VCF: Cutoff	Part	79	256	2	0	0 - 16383	0-127
VCF: Resonance	Part	71	257	2	1	0 - 16383	0-127
VCF: Env Amount	Part	73	258	2	2	0 - 16383	0-127
VCF: Filter Mode	Part	72	259	2	3	0 - 16383	0-127
VCF: Key Follow Amount	Part		260	2	4	0 - 16383	0-127
VCF: Vel > VCF Env	Part		261	2	5	0 - 16383	0-127

Parameter	Type	CC	NRPN	MSB	LSB	NRPN range	CC range
VCF: Filter Engine	Part		262	2	6	0: CLASSIC, 1: MIRROR TWINS	0: CLASSIC, 1: MIRROR TWINS
Amp: Drone	Part		384	3	0	0 - 16383	0-127
Amp: Pan	Part	10	385	3	1	0 - 16383	0-127
Amp: Vel > Amp	Part		386	3	2	0 - 16383	0-127
Amp: Env Amount	Part		387	3	3	0 - 16383	0-127
Perform: Pitch	Part		512	4	0	0 - 16383	0-127
Perform: Glide	Part	5	513	4	1	0 - 16383	0-127
Perform: Glide Mode	Part		514	4	2	0: Normal, 1: Legato	0: Normal, 1: Legato
Parts: Volume	Part	7	768	6	0	0 - 16383	0-127
Parts: Polyphony	Part		769	6	1	1 - 6	1 - 6
Parts: Unison	Part		770	6	2	1 - 6	1 - 6
Parts: Unison Pan Spread	Part		771	6	3	0 - 16383	0-127
Parts: Paraphony	Part		772	6	4	1 - 16	1 - 16
Parts: Trigger Mode	Part		773	6	5	0: Legato, 1: Retrig	0: Legato, 1: Retrig
Parts: Part Enabled	Part		774	6	6	0: false, 1: true	0: false, 1: true
Parts: Output	Part		775	6	7	0: Main, 1: Aux1, 2: Aux2, 3: MainL, 4: MainR, 5: Aux1L, 6: Aux1R, 7: Aux2L, 8: Aux2R	0: Main, 1: Aux1, 2: Aux2, 3: MainL, 4: MainR, 5: Aux1L, 6: Aux1R, 7: Aux2L, 8: Aux2R
Parts: Voices Mode	Part		776	6	8	0: Dynamic, 1: Reserve	0: Dynamic, 1: Reserve
Fx: Enabled	Global		1024	8	0	0: false, 1: true	0: false, 1: true

Parameter	Type	CC	NRPN	MSB	LSB	NRPN range	CC range
Fx: Engine	Global		1025	8	1	0: STAGE REVERB, 1: X-DELAY, 2: VINTAGE CHORUS, 3: CHORUS+	0: STAGE REVERB, 1: X-DELAY, 2: VINTAGE CHORUS, 3: CHORUS+
Clock: BPM	Global		1280	10	0	100 - 2500	100 - 2500
Key: DCO Key Follow	Part		1408	11	0	0 - 16383	0-127
Key: Lowest Key	Part		1409	11	1	0 - 127	0 - 127
Key: Highest Key	Part		1410	11	2	0 - 127	0 - 127
Wheel: Pitch Bend Up	Part		1792	14	0	0 - 24	0 - 24
Wheel: Pitch Bend Down	Part		1793	14	1	0 - 24	0 - 24
Amp: Attack	Part	14	2432	19	0	0 - 16383	0-127
Amp: Decay	Part	15	2433	19	1	0 - 16383	0-127
Amp: Sustain	Part	16	2434	19	2	0 - 16383	0-127
Amp: Release	Part	17	2435	19	3	0 - 16383	0-127
Amp: Reset	Part		2436	19	4	0: Off, 1: On	0: Off, 1: On
VCF: Attack	Part	18	2560	20	0	0 - 16383	0-127
VCF: Decay	Part	19	2561	20	1	0 - 16383	0-127
VCF: Sustain	Part	20	2562	20	2	0 - 16383	0-127
VCF: Release	Part	21	2563	20	3	0 - 16383	0-127
VCF: Reset	Part		2564	20	4	0: Off, 1: On	0: Off, 1: On
DCO: Attack	Part		2688	21	0	0 - 16383	0-127
DCO: Decay	Part		2689	21	1	0 - 16383	0-127
DCO: Sustain	Part		2690	21	2	0 - 16383	0-127

Parameter	Type	CC	NRPN	MSB	LSB	NRPN range	CC range
DCO: Release	Part		2691	21	3	0 - 16383	0-127
DCO: Reset	Part		2692	21	4	0: Off, 1: On	0: Off, 1: On
Aux: Attack	Part		2816	22	0	0 - 16383	0-127
Aux: Decay	Part		2817	22	1	0 - 16383	0-127
Aux: Sustain	Part		2818	22	2	0 - 16383	0-127
Aux: Release	Part		2819	22	3	0 - 16383	0-127
Aux: Reset	Part		2820	22	4	0: Off, 1: On	0: Off, 1: On
LFO 1: Rate	Part		2944	23	0	0 - 16383	0-127
LFO 1: Clock Multiplier	Part		2945	23	1	0: 8/1, 1: 4/1, 2: 2/1, 3: 1/1, 4: 1/2, 5: 1/4., 6: 1/2t, 7: 1/4, 8: 1/8., 9: 1/4t, 10: 1/8, 11: 1/16., 12: 1/8t, 13: 1/16, 14: 1/32., 15: 1/16t, 16: 1/32, 17: 1/64., 18: 1/32t, 19: 1/64	0: 8/1, 1: 4/1, 2: 2/1, 3: 1/1, 4: 1/2, 5: 1/4., 6: 1/2t, 7: 1/4, 8: 1/8., 9: 1/4t, 10: 1/8, 11: 1/16., 12: 1/8t, 13: 1/16, 14: 1/32., 15: 1/16t, 16: 1/32, 17: 1/64., 18: 1/32t, 19: 1/64
LFO 1: Wave	Part		2946	23	2	0: Tri, 1: Sqr, 2: Sin, 3: Saw, 4: RevSaw, 5: Exp, 6: RevExp, 7: Log, 8: RevLog, 9: S&H	0: Tri, 1: Sqr, 2: Sin, 3: Saw, 4: RevSaw, 5: Exp, 6: RevExp, 7: Log, 8: RevLog, 9: S&H
LFO 1: Sync	Part		2947	23	3	0: None, 1: NoteOn, 2: NoteOnPt, 3: NoteOff, 4: NteOffPt, 5: LFO1, 6: LFO2, 7: LFO3, 8: LFO4, 9: Clock	0: None, 1: NoteOn, 2: NoteOnPt, 3: NoteOff, 4: NteOffPt, 5: LFO1, 6: LFO2, 7: LFO3, 8: LFO4, 9: Clock
LFO 1: Reset Phase	Part		2948	23	4	0 - 16383	0-127
LFO 2: Rate	Part		3072	24	0	0 - 16383	0-127

Parameter	Type	CC	NRPN	MSB	LSB	NRPN range	CC range
LFO 2: Clock Multiplier	Part		3073	24	1	0: 8/1, 1: 4/1, 2: 2/1, 3: 1/1, 4: 1/2, 5: 1/4., 6: 1/2t, 7: 1/4, 8: 1/8., 9: 1/4t, 10: 1/8, 11: 1/16., 12: 1/8t, 13: 1/16, 14: 1/32., 15: 1/16t, 16: 1/32, 17: 1/64., 18: 1/32t, 19: 1/64	0: 8/1, 1: 4/1, 2: 2/1, 3: 1/1, 4: 1/2, 5: 1/4., 6: 1/2t, 7: 1/4, 8: 1/8., 9: 1/4t, 10: 1/8, 11: 1/16., 12: 1/8t, 13: 1/16, 14: 1/32., 15: 1/16t, 16: 1/32, 17: 1/64., 18: 1/32t, 19: 1/64
LFO 2: Wave	Part		3074	24	2	0: Tri, 1: Sqr, 2: Sin, 3: Saw, 4: RevSaw, 5: Exp, 6: RevExp, 7: Log, 8: RevLog, 9: S&H	0: Tri, 1: Sqr, 2: Sin, 3: Saw, 4: RevSaw, 5: Exp, 6: RevExp, 7: Log, 8: RevLog, 9: S&H
LFO 2: Sync	Part		3075	24	3	0: None, 1: NoteOn, 2: NoteOnPt, 3: NoteOff, 4: NteOffPt, 5: LFO1, 6: LFO2, 7: LFO3, 8: LFO4, 9: Clock	0: None, 1: NoteOn, 2: NoteOnPt, 3: NoteOff, 4: NteOffPt, 5: LFO1, 6: LFO2, 7: LFO3, 8: LFO4, 9: Clock
LFO 2: Reset Phase	Part		3076	24	4	0 - 16383	0-127
LFO 3: Rate	Part		3200	25	0	0 - 16383	0-127
LFO 3: Clock Multiplier	Part		3201	25	1	0: 8/1, 1: 4/1, 2: 2/1, 3: 1/1, 4: 1/2, 5: 1/4., 6: 1/2t, 7: 1/4, 8: 1/8., 9: 1/4t, 10: 1/8, 11: 1/16., 12: 1/8t, 13: 1/16, 14: 1/32., 15: 1/16t, 16: 1/32, 17: 1/64., 18: 1/32t, 19: 1/64	0: 8/1, 1: 4/1, 2: 2/1, 3: 1/1, 4: 1/2, 5: 1/4., 6: 1/2t, 7: 1/4, 8: 1/8., 9: 1/4t, 10: 1/8, 11: 1/16., 12: 1/8t, 13: 1/16, 14: 1/32., 15: 1/16t, 16: 1/32, 17: 1/64., 18: 1/32t, 19: 1/64
LFO 3: Wave	Part		3202	25	2	0: Tri, 1: Sqr, 2: Sin, 3: Saw, 4: RevSaw, 5: Exp, 6: RevExp, 7: Log, 8: RevLog, 9: S&H	0: Tri, 1: Sqr, 2: Sin, 3: Saw, 4: RevSaw, 5: Exp, 6: RevExp, 7: Log, 8: RevLog, 9: S&H

Parameter	Type	CC	NRPN	MSB	LSB	NRPN range	CC range
LFO 3: Sync	Part		3203	25	3	0: None, 1: NoteOn, 2: NoteOnPt, 3: NoteOff, 4: NteOffPt, 5: LFO1, 6: LFO2, 7: LFO3, 8: LFO4, 9: Clock	0: None, 1: NoteOn, 2: NoteOnPt, 3: NoteOff, 4: NteOffPt, 5: LFO1, 6: LFO2, 7: LFO3, 8: LFO4, 9: Clock
LFO 3: Reset Phase	Part		3204	25	4	0 - 16383	0-127
LFO 4: Rate	Part		3328	26	0	0 - 16383	0-127
LFO 4: Clock Multiplier	Part		3329	26	1	0: 8/1, 1: 4/1, 2: 2/1, 3: 1/1, 4: 1/2, 5: 1/4., 6: 1/2t, 7: 1/4, 8: 1/8., 9: 1/4t, 10: 1/8, 11: 1/16., 12: 1/8t, 13: 1/16, 14: 1/32., 15: 1/16t, 16: 1/32, 17: 1/64., 18: 1/32t, 19: 1/64	0: 8/1, 1: 4/1, 2: 2/1, 3: 1/1, 4: 1/2, 5: 1/4., 6: 1/2t, 7: 1/4, 8: 1/8., 9: 1/4t, 10: 1/8, 11: 1/16., 12: 1/8t, 13: 1/16, 14: 1/32., 15: 1/16t, 16: 1/32, 17: 1/64., 18: 1/32t, 19: 1/64
LFO 4: Wave	Part		3330	26	2	0: Tri, 1: Sqr, 2: Sin, 3: Saw, 4: RevSaw, 5: Exp, 6: RevExp, 7: Log, 8: RevLog, 9: S&H	0: Tri, 1: Sqr, 2: Sin, 3: Saw, 4: RevSaw, 5: Exp, 6: RevExp, 7: Log, 8: RevLog, 9: S&H
LFO 4: Sync	Part		3331	26	3	0: None, 1: NoteOn, 2: NoteOnPt, 3: NoteOff, 4: NteOffPt, 5: LFO1, 6: LFO2, 7: LFO3, 8: LFO4, 9: Clock	0: None, 1: NoteOn, 2: NoteOnPt, 3: NoteOff, 4: NteOffPt, 5: LFO1, 6: LFO2, 7: LFO3, 8: LFO4, 9: Clock
LFO 4: Reset Phase	Part		3332	26	4	0 - 16383	0-127
Seq: Enabled	Part		3456	27	0	0: false, 1: true	0: false, 1: true
Seq: Engine	Part		3457	27	1	0: CLASSIC ARP, 1: POLY SEQ	0: CLASSIC ARP, 1: POLY SEQ

Parameter	Type	CC	NRPN	MSB	LSB	NRPN range	CC range
Arp: Clock Multiplier	Part		3584	28	0	0: 8/1, 1: 4/1, 2: 2/1, 3: 1/1, 4: 1/2, 5: 1/4., 6: 1/2t, 7: 1/4, 8: 1/8., 9: 1/4t, 10: 1/8, 11: 1/16., 12: 1/8t, 13: 1/16, 14: 1/32., 15: 1/16t, 16: 1/32, 17: 1/64., 18: 1/32t, 19: 1/64	0: 8/1, 1: 4/1, 2: 2/1, 3: 1/1, 4: 1/2, 5: 1/4., 6: 1/2t, 7: 1/4, 8: 1/8., 9: 1/4t, 10: 1/8, 11: 1/16., 12: 1/8t, 13: 1/16, 14: 1/32., 15: 1/16t, 16: 1/32, 17: 1/64., 18: 1/32t, 19: 1/64
Arp: Gate	Part		3585	28	1	0 - 16383	0-127
Arp: Mode	Part		3586	28	2	0: Up, 1: Down, 2: UpDown, 3: UpDown2, 4: Played, 5: Random	0: Up, 1: Down, 2: UpDown, 3: UpDown2, 4: Played, 5: Random
Arp: Octaves	Part		3587	28	3	1 - 4	1 - 4
Arp: Sync	Part		3588	28	4	0: false, 1: true	0: false, 1: true
PolySeq: Step Length	Part		3712	29	0	0: 1/128, 1: 1/64, 2: 1/32, 3: 1/16t, 4: 1/32., 5: 1/16, 6: 1/8t, 7: 1/16., 8: 1/8, 9: 1/4t, 10: 1/8., 11: 1/4, 12: 1/2t, 13: 1/4., 14: 1/2, 15: 1/1	0: 1/128, 1: 1/64, 2: 1/32, 3: 1/16t, 4: 1/32., 5: 1/16, 6: 1/8t, 7: 1/16., 8: 1/8, 9: 1/4t, 10: 1/8., 11: 1/4, 12: 1/2t, 13: 1/4., 14: 1/2, 15: 1/1
PolySeq: NumSteps	Part		3713	29	1	1 - 32	1 - 32
VCF: Mirror Twins: Separation	Part		3840	30	0	0 - 16383	0-127
VCF: Mirror Twins: Depth	Part		3841	30	1	0 - 16383	0-127
VCF: Mirror Twins: Twin	Part		3842	30	2	0: false, 1: true	0: false, 1: true
FX: Stage Reverb: Decay	Global		3968	31	0	0 - 16383	0-127
FX: Stage Reverb: Level	Global		3969	31	1	0 - 16383	0-127
FX: Stage Reverb: Damping	Global		3970	31	2	0 - 16383	0-127

Parameter	Type	CC	NRPN	MSB	LSB	NRPN range	CC range
FX: Stage Reverb: Hi Cut	Global		3971	31	3	0 - 16383	0-127
FX: Stage Reverb: Lo Cut	Global		3972	31	4	0 - 16383	0-127
FX: Stage Reverb: Predelay	Global		3973	31	5	0 - 16383	0-127
FX: Stage Reverb: Stage	Global		3974	31	6	0: Shower, 1: Club, 2: Arena, 3: Canyon, 4: Cosmos	0: Shower, 1: Club, 2: Arena, 3: Canyon, 4: Cosmos
FX: Stage Reverb: Chorus	Global		3975	31	7	0: Off, 1: I, 2: II, 3: I + II	0: Off, 1: I, 2: II, 3: I + II
FX: Vintage Chorus: Mode	Global		4096	32	0	0: Off, 1: I, 2: II, 3: I + II	0: Off, 1: I, 2: II, 3: I + II
FX: Vintage Chorus: Level	Global		4097	32	1	0 - 16383	0-127
FX: Chorus+: Mix	Global		4224	33	0	0 - 16383	0-127
FX: Chorus+: Delay	Global		4225	33	1	0 - 16383	0-127
FX: Chorus+: Depth	Global		4226	33	2	0 - 16383	0-127
FX: Chorus+: Rate	Global		4227	33	3	0 - 16383	0-127
FX: Chorus+: Feedback	Global		4228	33	4	0 - 16383	0-127
FX: Chorus+: Tone	Global		4229	33	5	0 - 16383	0-127
FX: Chorus+: Mode	Global		4230	33	6	0: SqrWide, 1: SinWide, 2: Sqr, 3: Sin	0: SqrWide, 1: SinWide, 2: Sqr, 3: Sin
FX: X-Delay: Time	Global		4352	34	0	0 - 16383	0-127

Parameter	Type	CC	NRPN	MSB	LSB	NRPN range	CC range
FX: X-Delay: BPM Div	Global		4353	34	1	0: 1/32, 1: 1/16t, 2: 1/32., 3: 1/16, 4: 1/8t, 5: 1/16., 6: 1/8, 7: 1/4t, 8: 1/8., 9: 1/4, 10: 1/2t, 11: 1/4., 12: 1/2	0: 1/32, 1: 1/16t, 2: 1/32., 3: 1/16, 4: 1/8t, 5: 1/16., 6: 1/8, 7: 1/4t, 8: 1/8., 9: 1/4, 10: 1/2t, 11: 1/4., 12: 1/2
FX: X-Delay: Level	Global		4354	34	2	0 - 16383	0-127
FX: X-Delay: Feedback	Global		4355	34	3	0 - 16383	0-127
FX: X-Delay: Sync	Global		4356	34	4	0: false, 1: true	0: false, 1: true
FX: X-Delay: X-Pan	Global		4357	34	5	0 - 16383	0-127
FX: X-Delay: Time Offset	Global		4358	34	6	0 - 16383	0-127
FX: X-Delay: Damping	Global		4359	34	7	0 - 16383	0-127
FX: X-Delay: Chorus	Global		4360	34	8	0: Off, 1: I, 2: II, 3: I + II	0: Off, 1: I, 2: II, 3: I + II
Macro: 1	Global	111	4480	35	0	0 - 16383	0-127
Macro: 2	Global	112	4481	35	1	0 - 16383	0-127
Macro: 3	Global	113	4482	35	2	0 - 16383	0-127
Macro: 4	Global	114	4483	35	3	0 - 16383	0-127
Macro: 5	Global	115	4484	35	4	0 - 16383	0-127
Macro: 6	Global	116	4485	35	5	0 - 16383	0-127
Macro: 7	Global	117	4486	35	6	0 - 16383	0-127
Macro: 8	Global	118	4487	35	7	0 - 16383	0-127

Parameter	Type	CC	NRPN	MSB	LSB	NRPN range	CC range
Maths 1: Engine	Part		4608	36	0	0: SLEW, 1: CURVE, 2: FOLD & CLIP, 3: QUANTIZE, 4: MULTI-VIA, 5: SAMPLE & HOLD, 6: TRACK & HOLD, 7: SWITCH, 8: CROSSFADE	0: SLEW, 1: CURVE, 2: FOLD & CLIP, 3: QUANTIZE, 4: MULTI-VIA, 5: SAMPLE & HOLD, 6: TRACK & HOLD, 7: SWITCH, 8: CROSSFADE
Maths 1: Source Gain	Part		4609	36	1	0 - 16383	0-127
Maths 1: Source Bias	Part		4610	36	2	0 - 16383	0-127
Maths 1: Trigger	Part		4611	36	3	0: None, 1: NoteOn, 2: NoteOnPt, 3: NoteOff, 4: NteOffPt, 5: LFO1, 6: LFO2, 7: LFO3, 8: LFO4	0: None, 1: NoteOn, 2: NoteOnPt, 3: NoteOff, 4: NteOffPt, 5: LFO1, 6: LFO2, 7: LFO3, 8: LFO4

Parameter	Type	CC	NRPN	MSB	LSB	NRPN range	CC range
Maths 1: Control	Part		4612	36	4	0: Off, 1: DCO Env, 2: VCF Env, 3: Amp Env, 4: Aux Env, 5: LFO 1, 6: LFO 2, 7: LFO 3, 8: LFO 4, 9: Vel, 10: Off Vel, 11: AT, 12: Key, 13: Gate, 14: ModWheel, 15: PB, 16: VoiceIdx, 17: VoiceAlt, 18: VoiceRnd, 19: Uni Idx, 20: Uni Alt, 21: Poly Idx, 22: Poly Alt, 23: Note Rnd, 24: CC74, 25: ArpSeq, 26: Macro 1, 27: Macro 2, 28: Macro 3, 29: Macro 4, 30: Macro 5, 31: Macro 6, 32: Macro 7, 33: Macro 8, 34: Math 1, 35: Math 2, 36: Math 3, 37: Math 4	0: Off, 1: DCO Env, 2: VCF Env, 3: Amp Env, 4: Aux Env, 5: LFO 1, 6: LFO 2, 7: LFO 3, 8: LFO 4, 9: Vel, 10: Off Vel, 11: AT, 12: Key, 13: Gate, 14: ModWheel, 15: PB, 16: VoiceIdx, 17: VoiceAlt, 18: VoiceRnd, 19: Uni Idx, 20: Uni Alt, 21: Poly Idx, 22: Poly Alt, 23: Note Rnd, 24: CC74, 25: ArpSeq, 26: Macro 1, 27: Macro 2, 28: Macro 3, 29: Macro 4, 30: Macro 5, 31: Macro 6, 32: Macro 7, 33: Macro 8, 34: Math 1, 35: Math 2, 36: Math 3, 37: Math 4

Parameter	Type	CC	NRPN	MSB	LSB	NRPN range	CC range
Maths 1: Source 1	Part		4613	36	5	0: Off, 1: DCO Env, 2: VCF Env, 3: Amp Env, 4: Aux Env, 5: LFO 1, 6: LFO 2, 7: LFO 3, 8: LFO 4, 9: Vel, 10: Off Vel, 11: AT, 12: Key, 13: Gate, 14: ModWheel, 15: PB, 16: VoiceIdx, 17: VoiceAlt, 18: VoiceRnd, 19: Uni Idx, 20: Uni Alt, 21: Poly Idx, 22: Poly Alt, 23: Note Rnd, 24: CC74, 25: ArpSeq, 26: Macro 1, 27: Macro 2, 28: Macro 3, 29: Macro 4, 30: Macro 5, 31: Macro 6, 32: Macro 7, 33: Macro 8, 34: Math 1, 35: Math 2, 36: Math 3, 37: Math 4	0: Off, 1: DCO Env, 2: VCF Env, 3: Amp Env, 4: Aux Env, 5: LFO 1, 6: LFO 2, 7: LFO 3, 8: LFO 4, 9: Vel, 10: Off Vel, 11: AT, 12: Key, 13: Gate, 14: ModWheel, 15: PB, 16: VoiceIdx, 17: VoiceAlt, 18: VoiceRnd, 19: Uni Idx, 20: Uni Alt, 21: Poly Idx, 22: Poly Alt, 23: Note Rnd, 24: CC74, 25: ArpSeq, 26: Macro 1, 27: Macro 2, 28: Macro 3, 29: Macro 4, 30: Macro 5, 31: Macro 6, 32: Macro 7, 33: Macro 8, 34: Math 1, 35: Math 2, 36: Math 3, 37: Math 4

Parameter	Type	CC	NRPN	MSB	LSB	NRPN range	CC range
Maths 1: Source 2	Part		4614	36	6	0: Off, 1: DCO Env, 2: VCF Env, 3: Amp Env, 4: Aux Env, 5: LFO 1, 6: LFO 2, 7: LFO 3, 8: LFO 4, 9: Vel, 10: Off Vel, 11: AT, 12: Key, 13: Gate, 14: ModWheel, 15: PB, 16: VoiceIdx, 17: VoiceAlt, 18: VoiceRnd, 19: Uni Idx, 20: Uni Alt, 21: Poly Idx, 22: Poly Alt, 23: Note Rnd, 24: CC74, 25: ArpSeq, 26: Macro 1, 27: Macro 2, 28: Macro 3, 29: Macro 4, 30: Macro 5, 31: Macro 6, 32: Macro 7, 33: Macro 8, 34: Math 1, 35: Math 2, 36: Math 3, 37: Math 4	0: Off, 1: DCO Env, 2: VCF Env, 3: Amp Env, 4: Aux Env, 5: LFO 1, 6: LFO 2, 7: LFO 3, 8: LFO 4, 9: Vel, 10: Off Vel, 11: AT, 12: Key, 13: Gate, 14: ModWheel, 15: PB, 16: VoiceIdx, 17: VoiceAlt, 18: VoiceRnd, 19: Uni Idx, 20: Uni Alt, 21: Poly Idx, 22: Poly Alt, 23: Note Rnd, 24: CC74, 25: ArpSeq, 26: Macro 1, 27: Macro 2, 28: Macro 3, 29: Macro 4, 30: Macro 5, 31: Macro 6, 32: Macro 7, 33: Macro 8, 34: Math 1, 35: Math 2, 36: Math 3, 37: Math 4

Parameter	Type	CC	NRPN	MSB	LSB	NRPN range	CC range
Maths 1: Source 3	Part		4615	36	7	0: Off, 1: DCO Env, 2: VCF Env, 3: Amp Env, 4: Aux Env, 5: LFO 1, 6: LFO 2, 7: LFO 3, 8: LFO 4, 9: Vel, 10: Off Vel, 11: AT, 12: Key, 13: Gate, 14: ModWheel, 15: PB, 16: VoiceIdx, 17: VoiceAlt, 18: VoiceRnd, 19: Uni Idx, 20: Uni Alt, 21: Poly Idx, 22: Poly Alt, 23: Note Rnd, 24: CC74, 25: ArpSeq, 26: Macro 1, 27: Macro 2, 28: Macro 3, 29: Macro 4, 30: Macro 5, 31: Macro 6, 32: Macro 7, 33: Macro 8, 34: Math 1, 35: Math 2, 36: Math 3, 37: Math 4	0: Off, 1: DCO Env, 2: VCF Env, 3: Amp Env, 4: Aux Env, 5: LFO 1, 6: LFO 2, 7: LFO 3, 8: LFO 4, 9: Vel, 10: Off Vel, 11: AT, 12: Key, 13: Gate, 14: ModWheel, 15: PB, 16: VoiceIdx, 17: VoiceAlt, 18: VoiceRnd, 19: Uni Idx, 20: Uni Alt, 21: Poly Idx, 22: Poly Alt, 23: Note Rnd, 24: CC74, 25: ArpSeq, 26: Macro 1, 27: Macro 2, 28: Macro 3, 29: Macro 4, 30: Macro 5, 31: Macro 6, 32: Macro 7, 33: Macro 8, 34: Math 1, 35: Math 2, 36: Math 3, 37: Math 4

Parameter	Type	CC	NRPN	MSB	LSB	NRPN range	CC range
Maths 1: Source 4	Part		4616	36	8	0: Off, 1: DCO Env, 2: VCF Env, 3: Amp Env, 4: Aux Env, 5: LFO 1, 6: LFO 2, 7: LFO 3, 8: LFO 4, 9: Vel, 10: Off Vel, 11: AT, 12: Key, 13: Gate, 14: ModWheel, 15: PB, 16: VoiceIdx, 17: VoiceAlt, 18: VoiceRnd, 19: Uni Idx, 20: Uni Alt, 21: Poly Idx, 22: Poly Alt, 23: Note Rnd, 24: CC74, 25: ArpSeq, 26: Macro 1, 27: Macro 2, 28: Macro 3, 29: Macro 4, 30: Macro 5, 31: Macro 6, 32: Macro 7, 33: Macro 8, 34: Math 1, 35: Math 2, 36: Math 3, 37: Math 4	0: Off, 1: DCO Env, 2: VCF Env, 3: Amp Env, 4: Aux Env, 5: LFO 1, 6: LFO 2, 7: LFO 3, 8: LFO 4, 9: Vel, 10: Off Vel, 11: AT, 12: Key, 13: Gate, 14: ModWheel, 15: PB, 16: VoiceIdx, 17: VoiceAlt, 18: VoiceRnd, 19: Uni Idx, 20: Uni Alt, 21: Poly Idx, 22: Poly Alt, 23: Note Rnd, 24: CC74, 25: ArpSeq, 26: Macro 1, 27: Macro 2, 28: Macro 3, 29: Macro 4, 30: Macro 5, 31: Macro 6, 32: Macro 7, 33: Macro 8, 34: Math 1, 35: Math 2, 36: Math 3, 37: Math 4
Maths 1: Slew: Rise Time	Part		4648	36	40	0 - 16383	0-127
Maths 1: Slew: Fall Time	Part		4649	36	41	0 - 16383	0-127
Maths 1: Curve: Split	Part		4656	36	48	0 - 16383	0-127
Maths 1: Curve: Shelf	Part		4657	36	49	0 - 16383	0-127
Maths 1: Curve: CurveLo	Part		4658	36	50	0 - 16383	0-127
Maths 1: Curve: CurveHi	Part		4659	36	51	0 - 16383	0-127

Parameter	Type	CC	NRPN	MSB	LSB	NRPN range	CC range
Maths 1: Fold: Min	Part		4664	36	56	0 - 16383	0-127
Maths 1: Fold: Max	Part		4665	36	57	0 - 16383	0-127
Maths 1: Fold: Min Type	Part		4666	36	58	0: Clip, 1: Fold	0: Clip, 1: Fold
Maths 1: Fold: Min Type	Part		4667	36	59	0: Clip, 1: Fold	0: Clip, 1: Fold
Maths 1: Quantize: Quantize	Part		4672	36	64	0 - 16383	0-127
Maths 1: Multi-Via: Via 1	Part		4680	36	72	0: Off, 1: DCO Env, 2: VCF Env, 3: Amp Env, 4: Aux Env, 5: LFO 1, 6: LFO 2, 7: LFO 3, 8: LFO 4, 9: Vel, 10: Off Vel, 11: AT, 12: Key, 13: Gate, 14: ModWheel, 15: PB, 16: VoiceIdx, 17: VoiceAlt, 18: VoiceRnd, 19: Uni Idx, 20: Uni Alt, 21: Poly Idx, 22: Poly Alt, 23: Note Rnd, 24: CC74, 25: ArpSeq, 26: Macro 1, 27: Macro 2, 28: Macro 3, 29: Macro 4, 30: Macro 5, 31: Macro 6, 32: Macro 7, 33: Macro 8, 34: Math 1, 35: Math 2, 36: Math 3, 37: Math 4	0: Off, 1: DCO Env, 2: VCF Env, 3: Amp Env, 4: Aux Env, 5: LFO 1, 6: LFO 2, 7: LFO 3, 8: LFO 4, 9: Vel, 10: Off Vel, 11: AT, 12: Key, 13: Gate, 14: ModWheel, 15: PB, 16: VoiceIdx, 17: VoiceAlt, 18: VoiceRnd, 19: Uni Idx, 20: Uni Alt, 21: Poly Idx, 22: Poly Alt, 23: Note Rnd, 24: CC74, 25: ArpSeq, 26: Macro 1, 27: Macro 2, 28: Macro 3, 29: Macro 4, 30: Macro 5, 31: Macro 6, 32: Macro 7, 33: Macro 8, 34: Math 1, 35: Math 2, 36: Math 3, 37: Math 4
Maths 1: Multi-Via: Via 1 Amount	Part		4681	36	73	0 - 16383	0-127

Parameter	Type	CC	NRPN	MSB	LSB	NRPN range	CC range
Maths 1: Multi-Via: Via 2	Part		4682	36	74	0: Off, 1: DCO Env, 2: VCF Env, 3: Amp Env, 4: Aux Env, 5: LFO 1, 6: LFO 2, 7: LFO 3, 8: LFO 4, 9: Vel, 10: Off Vel, 11: AT, 12: Key, 13: Gate, 14: ModWheel, 15: PB, 16: VoiceIdx, 17: VoiceAlt, 18: VoiceRnd, 19: Uni Idx, 20: Uni Alt, 21: Poly Idx, 22: Poly Alt, 23: Note Rnd, 24: CC74, 25: ArpSeq, 26: Macro 1, 27: Macro 2, 28: Macro 3, 29: Macro 4, 30: Macro 5, 31: Macro 6, 32: Macro 7, 33: Macro 8, 34: Math 1, 35: Math 2, 36: Math 3, 37: Math 4	0: Off, 1: DCO Env, 2: VCF Env, 3: Amp Env, 4: Aux Env, 5: LFO 1, 6: LFO 2, 7: LFO 3, 8: LFO 4, 9: Vel, 10: Off Vel, 11: AT, 12: Key, 13: Gate, 14: ModWheel, 15: PB, 16: VoiceIdx, 17: VoiceAlt, 18: VoiceRnd, 19: Uni Idx, 20: Uni Alt, 21: Poly Idx, 22: Poly Alt, 23: Note Rnd, 24: CC74, 25: ArpSeq, 26: Macro 1, 27: Macro 2, 28: Macro 3, 29: Macro 4, 30: Macro 5, 31: Macro 6, 32: Macro 7, 33: Macro 8, 34: Math 1, 35: Math 2, 36: Math 3, 37: Math 4
Maths 1: Multi-Via: Via 2 Amount	Part		4683	36	75	0 - 16383	0-127

Parameter	Type	CC	NRPN	MSB	LSB	NRPN range	CC range
Maths 1: Multi-Via: Via 3	Part		4684	36	76	0: Off, 1: DCO Env, 2: VCF Env, 3: Amp Env, 4: Aux Env, 5: LFO 1, 6: LFO 2, 7: LFO 3, 8: LFO 4, 9: Vel, 10: Off Vel, 11: AT, 12: Key, 13: Gate, 14: ModWheel, 15: PB, 16: VoiceIdx, 17: VoiceAlt, 18: VoiceRnd, 19: Uni Idx, 20: Uni Alt, 21: Poly Idx, 22: Poly Alt, 23: Note Rnd, 24: CC74, 25: ArpSeq, 26: Macro 1, 27: Macro 2, 28: Macro 3, 29: Macro 4, 30: Macro 5, 31: Macro 6, 32: Macro 7, 33: Macro 8, 34: Math 1, 35: Math 2, 36: Math 3, 37: Math 4	0: Off, 1: DCO Env, 2: VCF Env, 3: Amp Env, 4: Aux Env, 5: LFO 1, 6: LFO 2, 7: LFO 3, 8: LFO 4, 9: Vel, 10: Off Vel, 11: AT, 12: Key, 13: Gate, 14: ModWheel, 15: PB, 16: VoiceIdx, 17: VoiceAlt, 18: VoiceRnd, 19: Uni Idx, 20: Uni Alt, 21: Poly Idx, 22: Poly Alt, 23: Note Rnd, 24: CC74, 25: ArpSeq, 26: Macro 1, 27: Macro 2, 28: Macro 3, 29: Macro 4, 30: Macro 5, 31: Macro 6, 32: Macro 7, 33: Macro 8, 34: Math 1, 35: Math 2, 36: Math 3, 37: Math 4
Maths 1: Multi-Via: Via 3 Amount	Part		4685	36	77	0 - 16383	0-127
Maths 1: Track & Hold: Threshold	Part		4688	36	80	0 - 16383	0-127
Maths 1: Track & Hold: Active	Part		4689	36	81	0: false, 1: true	0: false, 1: true
Maths 1: Crossfade: Crossfade	Part		4696	36	88	0: On, 1: Off	0: On, 1: Off

Parameter	Type	CC	NRPN	MSB	LSB	NRPN range	CC range
Maths 2: Engine	Part		4736	37	0	0: SLEW, 1: CURVE, 2: FOLD & CLIP, 3: QUANTIZE, 4: MULTI-VIA, 5: SAMPLE & HOLD, 6: TRACK & HOLD, 7: SWITCH, 8: CROSSFADE	0: SLEW, 1: CURVE, 2: FOLD & CLIP, 3: QUANTIZE, 4: MULTI-VIA, 5: SAMPLE & HOLD, 6: TRACK & HOLD, 7: SWITCH, 8: CROSSFADE
Maths 2: Source Gain	Part		4737	37	1	0 - 16383	0-127
Maths 2: Source Bias	Part		4738	37	2	0 - 16383	0-127
Maths 2: Trigger	Part		4739	37	3	0: None, 1: NoteOn, 2: NoteOnPt, 3: NoteOff, 4: NteOffPt, 5: LFO1, 6: LFO2, 7: LFO3, 8: LFO4	0: None, 1: NoteOn, 2: NoteOnPt, 3: NoteOff, 4: NteOffPt, 5: LFO1, 6: LFO2, 7: LFO3, 8: LFO4

Parameter	Type	CC	NRPN	MSB	LSB	NRPN range	CC range
Maths 2: Control	Part		4740	37	4	0: Off, 1: DCO Env, 2: VCF Env, 3: Amp Env, 4: Aux Env, 5: LFO 1, 6: LFO 2, 7: LFO 3, 8: LFO 4, 9: Vel, 10: Off Vel, 11: AT, 12: Key, 13: Gate, 14: ModWheel, 15: PB, 16: VoiceIdx, 17: VoiceAlt, 18: VoiceRnd, 19: Uni Idx, 20: Uni Alt, 21: Poly Idx, 22: Poly Alt, 23: Note Rnd, 24: CC74, 25: ArpSeq, 26: Macro 1, 27: Macro 2, 28: Macro 3, 29: Macro 4, 30: Macro 5, 31: Macro 6, 32: Macro 7, 33: Macro 8, 34: Math 1, 35: Math 2, 36: Math 3, 37: Math 4	0: Off, 1: DCO Env, 2: VCF Env, 3: Amp Env, 4: Aux Env, 5: LFO 1, 6: LFO 2, 7: LFO 3, 8: LFO 4, 9: Vel, 10: Off Vel, 11: AT, 12: Key, 13: Gate, 14: ModWheel, 15: PB, 16: VoiceIdx, 17: VoiceAlt, 18: VoiceRnd, 19: Uni Idx, 20: Uni Alt, 21: Poly Idx, 22: Poly Alt, 23: Note Rnd, 24: CC74, 25: ArpSeq, 26: Macro 1, 27: Macro 2, 28: Macro 3, 29: Macro 4, 30: Macro 5, 31: Macro 6, 32: Macro 7, 33: Macro 8, 34: Math 1, 35: Math 2, 36: Math 3, 37: Math 4

Parameter	Type	CC	NRPN	MSB	LSB	NRPN range	CC range
Maths 2: Source 1	Part		4741	37	5	0: Off, 1: DCO Env, 2: VCF Env, 3: Amp Env, 4: Aux Env, 5: LFO 1, 6: LFO 2, 7: LFO 3, 8: LFO 4, 9: Vel, 10: Off Vel, 11: AT, 12: Key, 13: Gate, 14: ModWheel, 15: PB, 16: VoiceIdx, 17: VoiceAlt, 18: VoiceRnd, 19: Uni Idx, 20: Uni Alt, 21: Poly Idx, 22: Poly Alt, 23: Note Rnd, 24: CC74, 25: ArpSeq, 26: Macro 1, 27: Macro 2, 28: Macro 3, 29: Macro 4, 30: Macro 5, 31: Macro 6, 32: Macro 7, 33: Macro 8, 34: Math 1, 35: Math 2, 36: Math 3, 37: Math 4	0: Off, 1: DCO Env, 2: VCF Env, 3: Amp Env, 4: Aux Env, 5: LFO 1, 6: LFO 2, 7: LFO 3, 8: LFO 4, 9: Vel, 10: Off Vel, 11: AT, 12: Key, 13: Gate, 14: ModWheel, 15: PB, 16: VoiceIdx, 17: VoiceAlt, 18: VoiceRnd, 19: Uni Idx, 20: Uni Alt, 21: Poly Idx, 22: Poly Alt, 23: Note Rnd, 24: CC74, 25: ArpSeq, 26: Macro 1, 27: Macro 2, 28: Macro 3, 29: Macro 4, 30: Macro 5, 31: Macro 6, 32: Macro 7, 33: Macro 8, 34: Math 1, 35: Math 2, 36: Math 3, 37: Math 4

Parameter	Type	CC	NRPN	MSB	LSB	NRPN range	CC range
Maths 2: Source 2	Part		4742	37	6	0: Off, 1: DCO Env, 2: VCF Env, 3: Amp Env, 4: Aux Env, 5: LFO 1, 6: LFO 2, 7: LFO 3, 8: LFO 4, 9: Vel, 10: Off Vel, 11: AT, 12: Key, 13: Gate, 14: ModWheel, 15: PB, 16: VoiceIdx, 17: VoiceAlt, 18: VoiceRnd, 19: Uni Idx, 20: Uni Alt, 21: Poly Idx, 22: Poly Alt, 23: Note Rnd, 24: CC74, 25: ArpSeq, 26: Macro 1, 27: Macro 2, 28: Macro 3, 29: Macro 4, 30: Macro 5, 31: Macro 6, 32: Macro 7, 33: Macro 8, 34: Math 1, 35: Math 2, 36: Math 3, 37: Math 4	0: Off, 1: DCO Env, 2: VCF Env, 3: Amp Env, 4: Aux Env, 5: LFO 1, 6: LFO 2, 7: LFO 3, 8: LFO 4, 9: Vel, 10: Off Vel, 11: AT, 12: Key, 13: Gate, 14: ModWheel, 15: PB, 16: VoiceIdx, 17: VoiceAlt, 18: VoiceRnd, 19: Uni Idx, 20: Uni Alt, 21: Poly Idx, 22: Poly Alt, 23: Note Rnd, 24: CC74, 25: ArpSeq, 26: Macro 1, 27: Macro 2, 28: Macro 3, 29: Macro 4, 30: Macro 5, 31: Macro 6, 32: Macro 7, 33: Macro 8, 34: Math 1, 35: Math 2, 36: Math 3, 37: Math 4

Parameter	Type	CC	NRPN	MSB	LSB	NRPN range	CC range
Maths 2: Source 3	Part		4743	37	7	0: Off, 1: DCO Env, 2: VCF Env, 3: Amp Env, 4: Aux Env, 5: LFO 1, 6: LFO 2, 7: LFO 3, 8: LFO 4, 9: Vel, 10: Off Vel, 11: AT, 12: Key, 13: Gate, 14: ModWheel, 15: PB, 16: VoiceIdx, 17: VoiceAlt, 18: VoiceRnd, 19: Uni Idx, 20: Uni Alt, 21: Poly Idx, 22: Poly Alt, 23: Note Rnd, 24: CC74, 25: ArpSeq, 26: Macro 1, 27: Macro 2, 28: Macro 3, 29: Macro 4, 30: Macro 5, 31: Macro 6, 32: Macro 7, 33: Macro 8, 34: Math 1, 35: Math 2, 36: Math 3, 37: Math 4	0: Off, 1: DCO Env, 2: VCF Env, 3: Amp Env, 4: Aux Env, 5: LFO 1, 6: LFO 2, 7: LFO 3, 8: LFO 4, 9: Vel, 10: Off Vel, 11: AT, 12: Key, 13: Gate, 14: ModWheel, 15: PB, 16: VoiceIdx, 17: VoiceAlt, 18: VoiceRnd, 19: Uni Idx, 20: Uni Alt, 21: Poly Idx, 22: Poly Alt, 23: Note Rnd, 24: CC74, 25: ArpSeq, 26: Macro 1, 27: Macro 2, 28: Macro 3, 29: Macro 4, 30: Macro 5, 31: Macro 6, 32: Macro 7, 33: Macro 8, 34: Math 1, 35: Math 2, 36: Math 3, 37: Math 4

Parameter	Type	CC	NRPN	MSB	LSB	NRPN range	CC range
Maths 2: Source 4	Part		4744	37	8	0: Off, 1: DCO Env, 2: VCF Env, 3: Amp Env, 4: Aux Env, 5: LFO 1, 6: LFO 2, 7: LFO 3, 8: LFO 4, 9: Vel, 10: Off Vel, 11: AT, 12: Key, 13: Gate, 14: ModWheel, 15: PB, 16: VoiceIdx, 17: VoiceAlt, 18: VoiceRnd, 19: Uni Idx, 20: Uni Alt, 21: Poly Idx, 22: Poly Alt, 23: Note Rnd, 24: CC74, 25: ArpSeq, 26: Macro 1, 27: Macro 2, 28: Macro 3, 29: Macro 4, 30: Macro 5, 31: Macro 6, 32: Macro 7, 33: Macro 8, 34: Math 1, 35: Math 2, 36: Math 3, 37: Math 4	0: Off, 1: DCO Env, 2: VCF Env, 3: Amp Env, 4: Aux Env, 5: LFO 1, 6: LFO 2, 7: LFO 3, 8: LFO 4, 9: Vel, 10: Off Vel, 11: AT, 12: Key, 13: Gate, 14: ModWheel, 15: PB, 16: VoiceIdx, 17: VoiceAlt, 18: VoiceRnd, 19: Uni Idx, 20: Uni Alt, 21: Poly Idx, 22: Poly Alt, 23: Note Rnd, 24: CC74, 25: ArpSeq, 26: Macro 1, 27: Macro 2, 28: Macro 3, 29: Macro 4, 30: Macro 5, 31: Macro 6, 32: Macro 7, 33: Macro 8, 34: Math 1, 35: Math 2, 36: Math 3, 37: Math 4
Maths 2: Slew: Rise Time	Part		4776	37	40	0 - 16383	0-127
Maths 2: Slew: Fall Time	Part		4777	37	41	0 - 16383	0-127
Maths 2: Curve: Split	Part		4784	37	48	0 - 16383	0-127
Maths 2: Curve: Shelf	Part		4785	37	49	0 - 16383	0-127
Maths 2: Curve: CurveLo	Part		4786	37	50	0 - 16383	0-127
Maths 2: Curve: CurveHi	Part		4787	37	51	0 - 16383	0-127

Parameter	Type	CC	NRPN	MSB	LSB	NRPN range	CC range
Maths 2: Fold: Min	Part		4792	37	56	0 - 16383	0-127
Maths 2: Fold: Max	Part		4793	37	57	0 - 16383	0-127
Maths 2: Fold: Min Type	Part		4794	37	58	0: Clip, 1: Fold	0: Clip, 1: Fold
Maths 2: Fold: Min Type	Part		4795	37	59	0: Clip, 1: Fold	0: Clip, 1: Fold
Maths 2: Quantize: Quantize	Part		4800	37	64	0 - 16383	0-127
Maths 2: Multi-Via: Via 1	Part		4808	37	72	0: Off, 1: DCO Env, 2: VCF Env, 3: Amp Env, 4: Aux Env, 5: LFO 1, 6: LFO 2, 7: LFO 3, 8: LFO 4, 9: Vel, 10: Off Vel, 11: AT, 12: Key, 13: Gate, 14: ModWheel, 15: PB, 16: VoiceIdx, 17: VoiceAlt, 18: VoiceRnd, 19: Uni Idx, 20: Uni Alt, 21: Poly Idx, 22: Poly Alt, 23: Note Rnd, 24: CC74, 25: ArpSeq, 26: Macro 1, 27: Macro 2, 28: Macro 3, 29: Macro 4, 30: Macro 5, 31: Macro 6, 32: Macro 7, 33: Macro 8, 34: Math 1, 35: Math 2, 36: Math 3, 37: Math 4	0: Off, 1: DCO Env, 2: VCF Env, 3: Amp Env, 4: Aux Env, 5: LFO 1, 6: LFO 2, 7: LFO 3, 8: LFO 4, 9: Vel, 10: Off Vel, 11: AT, 12: Key, 13: Gate, 14: ModWheel, 15: PB, 16: VoiceIdx, 17: VoiceAlt, 18: VoiceRnd, 19: Uni Idx, 20: Uni Alt, 21: Poly Idx, 22: Poly Alt, 23: Note Rnd, 24: CC74, 25: ArpSeq, 26: Macro 1, 27: Macro 2, 28: Macro 3, 29: Macro 4, 30: Macro 5, 31: Macro 6, 32: Macro 7, 33: Macro 8, 34: Math 1, 35: Math 2, 36: Math 3, 37: Math 4
Maths 2: Multi-Via: Via 1 Amount	Part		4809	37	73	0 - 16383	0-127

Parameter	Type	CC	NRPN	MSB	LSB	NRPN range	CC range
Maths 2: Multi-Via: Via 2	Part		4810	37	74	0: Off, 1: DCO Env, 2: VCF Env, 3: Amp Env, 4: Aux Env, 5: LFO 1, 6: LFO 2, 7: LFO 3, 8: LFO 4, 9: Vel, 10: Off Vel, 11: AT, 12: Key, 13: Gate, 14: ModWheel, 15: PB, 16: VoiceIdx, 17: VoiceAlt, 18: VoiceRnd, 19: Uni Idx, 20: Uni Alt, 21: Poly Idx, 22: Poly Alt, 23: Note Rnd, 24: CC74, 25: ArpSeq, 26: Macro 1, 27: Macro 2, 28: Macro 3, 29: Macro 4, 30: Macro 5, 31: Macro 6, 32: Macro 7, 33: Macro 8, 34: Math 1, 35: Math 2, 36: Math 3, 37: Math 4	0: Off, 1: DCO Env, 2: VCF Env, 3: Amp Env, 4: Aux Env, 5: LFO 1, 6: LFO 2, 7: LFO 3, 8: LFO 4, 9: Vel, 10: Off Vel, 11: AT, 12: Key, 13: Gate, 14: ModWheel, 15: PB, 16: VoiceIdx, 17: VoiceAlt, 18: VoiceRnd, 19: Uni Idx, 20: Uni Alt, 21: Poly Idx, 22: Poly Alt, 23: Note Rnd, 24: CC74, 25: ArpSeq, 26: Macro 1, 27: Macro 2, 28: Macro 3, 29: Macro 4, 30: Macro 5, 31: Macro 6, 32: Macro 7, 33: Macro 8, 34: Math 1, 35: Math 2, 36: Math 3, 37: Math 4
Maths 2: Multi-Via: Via 2 Amount	Part		4811	37	75	0 - 16383	0-127

Parameter	Type	CC	NRPN	MSB	LSB	NRPN range	CC range
Maths 2: Multi-Via: Via 3	Part		4812	37	76	0: Off, 1: DCO Env, 2: VCF Env, 3: Amp Env, 4: Aux Env, 5: LFO 1, 6: LFO 2, 7: LFO 3, 8: LFO 4, 9: Vel, 10: Off Vel, 11: AT, 12: Key, 13: Gate, 14: ModWheel, 15: PB, 16: VoiceIdx, 17: VoiceAlt, 18: VoiceRnd, 19: Uni Idx, 20: Uni Alt, 21: Poly Idx, 22: Poly Alt, 23: Note Rnd, 24: CC74, 25: ArpSeq, 26: Macro 1, 27: Macro 2, 28: Macro 3, 29: Macro 4, 30: Macro 5, 31: Macro 6, 32: Macro 7, 33: Macro 8, 34: Math 1, 35: Math 2, 36: Math 3, 37: Math 4	0: Off, 1: DCO Env, 2: VCF Env, 3: Amp Env, 4: Aux Env, 5: LFO 1, 6: LFO 2, 7: LFO 3, 8: LFO 4, 9: Vel, 10: Off Vel, 11: AT, 12: Key, 13: Gate, 14: ModWheel, 15: PB, 16: VoiceIdx, 17: VoiceAlt, 18: VoiceRnd, 19: Uni Idx, 20: Uni Alt, 21: Poly Idx, 22: Poly Alt, 23: Note Rnd, 24: CC74, 25: ArpSeq, 26: Macro 1, 27: Macro 2, 28: Macro 3, 29: Macro 4, 30: Macro 5, 31: Macro 6, 32: Macro 7, 33: Macro 8, 34: Math 1, 35: Math 2, 36: Math 3, 37: Math 4
Maths 2: Multi-Via: Via 3 Amount	Part		4813	37	77	0 - 16383	0-127
Maths 2: Track & Hold: Threshold	Part		4816	37	80	0 - 16383	0-127
Maths 2: Track & Hold: Active	Part		4817	37	81	0: false, 1: true	0: false, 1: true
Maths 2: Crossfade: Crossfade	Part		4824	37	88	0: On, 1: Off	0: On, 1: Off

Parameter	Type	CC	NRPN	MSB	LSB	NRPN range	CC range
Maths 3: Engine	Part		4864	38	0	0: SLEW, 1: CURVE, 2: FOLD & CLIP, 3: QUANTIZE, 4: MULTI-VIA, 5: SAMPLE & HOLD, 6: TRACK & HOLD, 7: SWITCH, 8: CROSSFADE	0: SLEW, 1: CURVE, 2: FOLD & CLIP, 3: QUANTIZE, 4: MULTI-VIA, 5: SAMPLE & HOLD, 6: TRACK & HOLD, 7: SWITCH, 8: CROSSFADE
Maths 3: Source Gain	Part		4865	38	1	0 - 16383	0-127
Maths 3: Source Bias	Part		4866	38	2	0 - 16383	0-127
Maths 3: Trigger	Part		4867	38	3	0: None, 1: NoteOn, 2: NoteOnPt, 3: NoteOff, 4: NteOffPt, 5: LFO1, 6: LFO2, 7: LFO3, 8: LFO4	0: None, 1: NoteOn, 2: NoteOnPt, 3: NoteOff, 4: NteOffPt, 5: LFO1, 6: LFO2, 7: LFO3, 8: LFO4

Parameter	Type	CC	NRPN	MSB	LSB	NRPN range	CC range
Maths 3: Control	Part		4868	38	4	0: Off, 1: DCO Env, 2: VCF Env, 3: Amp Env, 4: Aux Env, 5: LFO 1, 6: LFO 2, 7: LFO 3, 8: LFO 4, 9: Vel, 10: Off Vel, 11: AT, 12: Key, 13: Gate, 14: ModWheel, 15: PB, 16: VoiceIdx, 17: VoiceAlt, 18: VoiceRnd, 19: Uni Idx, 20: Uni Alt, 21: Poly Idx, 22: Poly Alt, 23: Note Rnd, 24: CC74, 25: ArpSeq, 26: Macro 1, 27: Macro 2, 28: Macro 3, 29: Macro 4, 30: Macro 5, 31: Macro 6, 32: Macro 7, 33: Macro 8, 34: Math 1, 35: Math 2, 36: Math 3, 37: Math 4	0: Off, 1: DCO Env, 2: VCF Env, 3: Amp Env, 4: Aux Env, 5: LFO 1, 6: LFO 2, 7: LFO 3, 8: LFO 4, 9: Vel, 10: Off Vel, 11: AT, 12: Key, 13: Gate, 14: ModWheel, 15: PB, 16: VoiceIdx, 17: VoiceAlt, 18: VoiceRnd, 19: Uni Idx, 20: Uni Alt, 21: Poly Idx, 22: Poly Alt, 23: Note Rnd, 24: CC74, 25: ArpSeq, 26: Macro 1, 27: Macro 2, 28: Macro 3, 29: Macro 4, 30: Macro 5, 31: Macro 6, 32: Macro 7, 33: Macro 8, 34: Math 1, 35: Math 2, 36: Math 3, 37: Math 4

Parameter	Type	CC	NRPN	MSB	LSB	NRPN range	CC range
Maths 3: Source 1	Part		4869	38	5	0: Off, 1: DCO Env, 2: VCF Env, 3: Amp Env, 4: Aux Env, 5: LFO 1, 6: LFO 2, 7: LFO 3, 8: LFO 4, 9: Vel, 10: Off Vel, 11: AT, 12: Key, 13: Gate, 14: ModWheel, 15: PB, 16: VoiceIdx, 17: VoiceAlt, 18: VoiceRnd, 19: Uni Idx, 20: Uni Alt, 21: Poly Idx, 22: Poly Alt, 23: Note Rnd, 24: CC74, 25: ArpSeq, 26: Macro 1, 27: Macro 2, 28: Macro 3, 29: Macro 4, 30: Macro 5, 31: Macro 6, 32: Macro 7, 33: Macro 8, 34: Math 1, 35: Math 2, 36: Math 3, 37: Math 4	0: Off, 1: DCO Env, 2: VCF Env, 3: Amp Env, 4: Aux Env, 5: LFO 1, 6: LFO 2, 7: LFO 3, 8: LFO 4, 9: Vel, 10: Off Vel, 11: AT, 12: Key, 13: Gate, 14: ModWheel, 15: PB, 16: VoiceIdx, 17: VoiceAlt, 18: VoiceRnd, 19: Uni Idx, 20: Uni Alt, 21: Poly Idx, 22: Poly Alt, 23: Note Rnd, 24: CC74, 25: ArpSeq, 26: Macro 1, 27: Macro 2, 28: Macro 3, 29: Macro 4, 30: Macro 5, 31: Macro 6, 32: Macro 7, 33: Macro 8, 34: Math 1, 35: Math 2, 36: Math 3, 37: Math 4

Parameter	Type	CC	NRPN	MSB	LSB	NRPN range	CC range
Maths 3: Source 2	Part		4870	38	6	0: Off, 1: DCO Env, 2: VCF Env, 3: Amp Env, 4: Aux Env, 5: LFO 1, 6: LFO 2, 7: LFO 3, 8: LFO 4, 9: Vel, 10: Off Vel, 11: AT, 12: Key, 13: Gate, 14: ModWheel, 15: PB, 16: VoiceIdx, 17: VoiceAlt, 18: VoiceRnd, 19: Uni Idx, 20: Uni Alt, 21: Poly Idx, 22: Poly Alt, 23: Note Rnd, 24: CC74, 25: ArpSeq, 26: Macro 1, 27: Macro 2, 28: Macro 3, 29: Macro 4, 30: Macro 5, 31: Macro 6, 32: Macro 7, 33: Macro 8, 34: Math 1, 35: Math 2, 36: Math 3, 37: Math 4	0: Off, 1: DCO Env, 2: VCF Env, 3: Amp Env, 4: Aux Env, 5: LFO 1, 6: LFO 2, 7: LFO 3, 8: LFO 4, 9: Vel, 10: Off Vel, 11: AT, 12: Key, 13: Gate, 14: ModWheel, 15: PB, 16: VoiceIdx, 17: VoiceAlt, 18: VoiceRnd, 19: Uni Idx, 20: Uni Alt, 21: Poly Idx, 22: Poly Alt, 23: Note Rnd, 24: CC74, 25: ArpSeq, 26: Macro 1, 27: Macro 2, 28: Macro 3, 29: Macro 4, 30: Macro 5, 31: Macro 6, 32: Macro 7, 33: Macro 8, 34: Math 1, 35: Math 2, 36: Math 3, 37: Math 4

Parameter	Type	CC	NRPN	MSB	LSB	NRPN range	CC range
Maths 3: Source 3	Part		4871	38	7	0: Off, 1: DCO Env, 2: VCF Env, 3: Amp Env, 4: Aux Env, 5: LFO 1, 6: LFO 2, 7: LFO 3, 8: LFO 4, 9: Vel, 10: Off Vel, 11: AT, 12: Key, 13: Gate, 14: ModWheel, 15: PB, 16: VoiceIdx, 17: VoiceAlt, 18: VoiceRnd, 19: Uni Idx, 20: Uni Alt, 21: Poly Idx, 22: Poly Alt, 23: Note Rnd, 24: CC74, 25: ArpSeq, 26: Macro 1, 27: Macro 2, 28: Macro 3, 29: Macro 4, 30: Macro 5, 31: Macro 6, 32: Macro 7, 33: Macro 8, 34: Math 1, 35: Math 2, 36: Math 3, 37: Math 4	0: Off, 1: DCO Env, 2: VCF Env, 3: Amp Env, 4: Aux Env, 5: LFO 1, 6: LFO 2, 7: LFO 3, 8: LFO 4, 9: Vel, 10: Off Vel, 11: AT, 12: Key, 13: Gate, 14: ModWheel, 15: PB, 16: VoiceIdx, 17: VoiceAlt, 18: VoiceRnd, 19: Uni Idx, 20: Uni Alt, 21: Poly Idx, 22: Poly Alt, 23: Note Rnd, 24: CC74, 25: ArpSeq, 26: Macro 1, 27: Macro 2, 28: Macro 3, 29: Macro 4, 30: Macro 5, 31: Macro 6, 32: Macro 7, 33: Macro 8, 34: Math 1, 35: Math 2, 36: Math 3, 37: Math 4

Parameter	Type	CC	NRPN	MSB	LSB	NRPN range	CC range
Maths 3: Source 4	Part		4872	38	8	0: Off, 1: DCO Env, 2: VCF Env, 3: Amp Env, 4: Aux Env, 5: LFO 1, 6: LFO 2, 7: LFO 3, 8: LFO 4, 9: Vel, 10: Off Vel, 11: AT, 12: Key, 13: Gate, 14: ModWheel, 15: PB, 16: VoiceIdx, 17: VoiceAlt, 18: VoiceRnd, 19: Uni Idx, 20: Uni Alt, 21: Poly Idx, 22: Poly Alt, 23: Note Rnd, 24: CC74, 25: ArpSeq, 26: Macro 1, 27: Macro 2, 28: Macro 3, 29: Macro 4, 30: Macro 5, 31: Macro 6, 32: Macro 7, 33: Macro 8, 34: Math 1, 35: Math 2, 36: Math 3, 37: Math 4	0: Off, 1: DCO Env, 2: VCF Env, 3: Amp Env, 4: Aux Env, 5: LFO 1, 6: LFO 2, 7: LFO 3, 8: LFO 4, 9: Vel, 10: Off Vel, 11: AT, 12: Key, 13: Gate, 14: ModWheel, 15: PB, 16: VoiceIdx, 17: VoiceAlt, 18: VoiceRnd, 19: Uni Idx, 20: Uni Alt, 21: Poly Idx, 22: Poly Alt, 23: Note Rnd, 24: CC74, 25: ArpSeq, 26: Macro 1, 27: Macro 2, 28: Macro 3, 29: Macro 4, 30: Macro 5, 31: Macro 6, 32: Macro 7, 33: Macro 8, 34: Math 1, 35: Math 2, 36: Math 3, 37: Math 4
Maths 3: Slew: Rise Time	Part		4904	38	40	0 - 16383	0-127
Maths 3: Slew: Fall Time	Part		4905	38	41	0 - 16383	0-127
Maths 3: Curve: Split	Part		4912	38	48	0 - 16383	0-127
Maths 3: Curve: Shelf	Part		4913	38	49	0 - 16383	0-127
Maths 3: Curve: CurveLo	Part		4914	38	50	0 - 16383	0-127
Maths 3: Curve: CurveHi	Part		4915	38	51	0 - 16383	0-127

Parameter	Type	CC	NRPN	MSB	LSB	NRPN range	CC range
Maths 3: Fold: Min	Part		4920	38	56	0 - 16383	0-127
Maths 3: Fold: Max	Part		4921	38	57	0 - 16383	0-127
Maths 3: Fold: Min Type	Part		4922	38	58	0: Clip, 1: Fold	0: Clip, 1: Fold
Maths 3: Fold: Min Type	Part		4923	38	59	0: Clip, 1: Fold	0: Clip, 1: Fold
Maths 3: Quantize: Quantize	Part		4928	38	64	0 - 16383	0-127
Maths 3: Multi-Via: Via 1	Part		4936	38	72	0: Off, 1: DCO Env, 2: VCF Env, 3: Amp Env, 4: Aux Env, 5: LFO 1, 6: LFO 2, 7: LFO 3, 8: LFO 4, 9: Vel, 10: Off Vel, 11: AT, 12: Key, 13: Gate, 14: ModWheel, 15: PB, 16: VoiceIdx, 17: VoiceAlt, 18: VoiceRnd, 19: Uni Idx, 20: Uni Alt, 21: Poly Idx, 22: Poly Alt, 23: Note Rnd, 24: CC74, 25: ArpSeq, 26: Macro 1, 27: Macro 2, 28: Macro 3, 29: Macro 4, 30: Macro 5, 31: Macro 6, 32: Macro 7, 33: Macro 8, 34: Math 1, 35: Math 2, 36: Math 3, 37: Math 4	0: Off, 1: DCO Env, 2: VCF Env, 3: Amp Env, 4: Aux Env, 5: LFO 1, 6: LFO 2, 7: LFO 3, 8: LFO 4, 9: Vel, 10: Off Vel, 11: AT, 12: Key, 13: Gate, 14: ModWheel, 15: PB, 16: VoiceIdx, 17: VoiceAlt, 18: VoiceRnd, 19: Uni Idx, 20: Uni Alt, 21: Poly Idx, 22: Poly Alt, 23: Note Rnd, 24: CC74, 25: ArpSeq, 26: Macro 1, 27: Macro 2, 28: Macro 3, 29: Macro 4, 30: Macro 5, 31: Macro 6, 32: Macro 7, 33: Macro 8, 34: Math 1, 35: Math 2, 36: Math 3, 37: Math 4
Maths 3: Multi-Via: Via 1 Amount	Part		4937	38	73	0 - 16383	0-127

Parameter	Type	CC	NRPN	MSB	LSB	NRPN range	CC range
Maths 3: Multi-Via: Via 2	Part		4938	38	74	0: Off, 1: DCO Env, 2: VCF Env, 3: Amp Env, 4: Aux Env, 5: LFO 1, 6: LFO 2, 7: LFO 3, 8: LFO 4, 9: Vel, 10: Off Vel, 11: AT, 12: Key, 13: Gate, 14: ModWheel, 15: PB, 16: VoiceIdx, 17: VoiceAlt, 18: VoiceRnd, 19: Uni Idx, 20: Uni Alt, 21: Poly Idx, 22: Poly Alt, 23: Note Rnd, 24: CC74, 25: ArpSeq, 26: Macro 1, 27: Macro 2, 28: Macro 3, 29: Macro 4, 30: Macro 5, 31: Macro 6, 32: Macro 7, 33: Macro 8, 34: Math 1, 35: Math 2, 36: Math 3, 37: Math 4	0: Off, 1: DCO Env, 2: VCF Env, 3: Amp Env, 4: Aux Env, 5: LFO 1, 6: LFO 2, 7: LFO 3, 8: LFO 4, 9: Vel, 10: Off Vel, 11: AT, 12: Key, 13: Gate, 14: ModWheel, 15: PB, 16: VoiceIdx, 17: VoiceAlt, 18: VoiceRnd, 19: Uni Idx, 20: Uni Alt, 21: Poly Idx, 22: Poly Alt, 23: Note Rnd, 24: CC74, 25: ArpSeq, 26: Macro 1, 27: Macro 2, 28: Macro 3, 29: Macro 4, 30: Macro 5, 31: Macro 6, 32: Macro 7, 33: Macro 8, 34: Math 1, 35: Math 2, 36: Math 3, 37: Math 4
Maths 3: Multi-Via: Via 2 Amount	Part		4939	38	75	0 - 16383	0-127

Parameter	Type	CC	NRPN	MSB	LSB	NRPN range	CC range
Maths 3: Multi-Via: Via 3	Part		4940	38	76	0: Off, 1: DCO Env, 2: VCF Env, 3: Amp Env, 4: Aux Env, 5: LFO 1, 6: LFO 2, 7: LFO 3, 8: LFO 4, 9: Vel, 10: Off Vel, 11: AT, 12: Key, 13: Gate, 14: ModWheel, 15: PB, 16: VoiceIdx, 17: VoiceAlt, 18: VoiceRnd, 19: Uni Idx, 20: Uni Alt, 21: Poly Idx, 22: Poly Alt, 23: Note Rnd, 24: CC74, 25: ArpSeq, 26: Macro 1, 27: Macro 2, 28: Macro 3, 29: Macro 4, 30: Macro 5, 31: Macro 6, 32: Macro 7, 33: Macro 8, 34: Math 1, 35: Math 2, 36: Math 3, 37: Math 4	0: Off, 1: DCO Env, 2: VCF Env, 3: Amp Env, 4: Aux Env, 5: LFO 1, 6: LFO 2, 7: LFO 3, 8: LFO 4, 9: Vel, 10: Off Vel, 11: AT, 12: Key, 13: Gate, 14: ModWheel, 15: PB, 16: VoiceIdx, 17: VoiceAlt, 18: VoiceRnd, 19: Uni Idx, 20: Uni Alt, 21: Poly Idx, 22: Poly Alt, 23: Note Rnd, 24: CC74, 25: ArpSeq, 26: Macro 1, 27: Macro 2, 28: Macro 3, 29: Macro 4, 30: Macro 5, 31: Macro 6, 32: Macro 7, 33: Macro 8, 34: Math 1, 35: Math 2, 36: Math 3, 37: Math 4
Maths 3: Multi-Via: Via 3 Amount	Part		4941	38	77	0 - 16383	0-127
Maths 3: Track & Hold: Threshold	Part		4944	38	80	0 - 16383	0-127
Maths 3: Track & Hold: Active	Part		4945	38	81	0: false, 1: true	0: false, 1: true
Maths 3: Crossfade: Crossfade	Part		4952	38	88	0: On, 1: Off	0: On, 1: Off

Parameter	Type	CC	NRPN	MSB	LSB	NRPN range	CC range
Maths 4: Engine	Part		4992	39	0	0: SLEW, 1: CURVE, 2: FOLD & CLIP, 3: QUANTIZE, 4: MULTI-VIA, 5: SAMPLE & HOLD, 6: TRACK & HOLD, 7: SWITCH, 8: CROSSFADE	0: SLEW, 1: CURVE, 2: FOLD & CLIP, 3: QUANTIZE, 4: MULTI-VIA, 5: SAMPLE & HOLD, 6: TRACK & HOLD, 7: SWITCH, 8: CROSSFADE
Maths 4: Source Gain	Part		4993	39	1	0 - 16383	0-127
Maths 4: Source Bias	Part		4994	39	2	0 - 16383	0-127
Maths 4: Trigger	Part		4995	39	3	0: None, 1: NoteOn, 2: NoteOnPt, 3: NoteOff, 4: NteOffPt, 5: LFO1, 6: LFO2, 7: LFO3, 8: LFO4	0: None, 1: NoteOn, 2: NoteOnPt, 3: NoteOff, 4: NteOffPt, 5: LFO1, 6: LFO2, 7: LFO3, 8: LFO4

Parameter	Type	CC	NRPN	MSB	LSB	NRPN range	CC range
Maths 4: Control	Part		4996	39	4	0: Off, 1: DCO Env, 2: VCF Env, 3: Amp Env, 4: Aux Env, 5: LFO 1, 6: LFO 2, 7: LFO 3, 8: LFO 4, 9: Vel, 10: Off Vel, 11: AT, 12: Key, 13: Gate, 14: ModWheel, 15: PB, 16: VoiceIdx, 17: VoiceAlt, 18: VoiceRnd, 19: Uni Idx, 20: Uni Alt, 21: Poly Idx, 22: Poly Alt, 23: Note Rnd, 24: CC74, 25: ArpSeq, 26: Macro 1, 27: Macro 2, 28: Macro 3, 29: Macro 4, 30: Macro 5, 31: Macro 6, 32: Macro 7, 33: Macro 8, 34: Math 1, 35: Math 2, 36: Math 3, 37: Math 4	0: Off, 1: DCO Env, 2: VCF Env, 3: Amp Env, 4: Aux Env, 5: LFO 1, 6: LFO 2, 7: LFO 3, 8: LFO 4, 9: Vel, 10: Off Vel, 11: AT, 12: Key, 13: Gate, 14: ModWheel, 15: PB, 16: VoiceIdx, 17: VoiceAlt, 18: VoiceRnd, 19: Uni Idx, 20: Uni Alt, 21: Poly Idx, 22: Poly Alt, 23: Note Rnd, 24: CC74, 25: ArpSeq, 26: Macro 1, 27: Macro 2, 28: Macro 3, 29: Macro 4, 30: Macro 5, 31: Macro 6, 32: Macro 7, 33: Macro 8, 34: Math 1, 35: Math 2, 36: Math 3, 37: Math 4

Parameter	Type	CC	NRPN	MSB	LSB	NRPN range	CC range
Maths 4: Source 1	Part		4997	39	5	0: Off, 1: DCO Env, 2: VCF Env, 3: Amp Env, 4: Aux Env, 5: LFO 1, 6: LFO 2, 7: LFO 3, 8: LFO 4, 9: Vel, 10: Off Vel, 11: AT, 12: Key, 13: Gate, 14: ModWheel, 15: PB, 16: VoiceIdx, 17: VoiceAlt, 18: VoiceRnd, 19: Uni Idx, 20: Uni Alt, 21: Poly Idx, 22: Poly Alt, 23: Note Rnd, 24: CC74, 25: ArpSeq, 26: Macro 1, 27: Macro 2, 28: Macro 3, 29: Macro 4, 30: Macro 5, 31: Macro 6, 32: Macro 7, 33: Macro 8, 34: Math 1, 35: Math 2, 36: Math 3, 37: Math 4	0: Off, 1: DCO Env, 2: VCF Env, 3: Amp Env, 4: Aux Env, 5: LFO 1, 6: LFO 2, 7: LFO 3, 8: LFO 4, 9: Vel, 10: Off Vel, 11: AT, 12: Key, 13: Gate, 14: ModWheel, 15: PB, 16: VoiceIdx, 17: VoiceAlt, 18: VoiceRnd, 19: Uni Idx, 20: Uni Alt, 21: Poly Idx, 22: Poly Alt, 23: Note Rnd, 24: CC74, 25: ArpSeq, 26: Macro 1, 27: Macro 2, 28: Macro 3, 29: Macro 4, 30: Macro 5, 31: Macro 6, 32: Macro 7, 33: Macro 8, 34: Math 1, 35: Math 2, 36: Math 3, 37: Math 4

Parameter	Type	CC	NRPN	MSB	LSB	NRPN range	CC range
Maths 4: Source 2	Part		4998	39	6	0: Off, 1: DCO Env, 2: VCF Env, 3: Amp Env, 4: Aux Env, 5: LFO 1, 6: LFO 2, 7: LFO 3, 8: LFO 4, 9: Vel, 10: Off Vel, 11: AT, 12: Key, 13: Gate, 14: ModWheel, 15: PB, 16: VoiceIdx, 17: VoiceAlt, 18: VoiceRnd, 19: Uni Idx, 20: Uni Alt, 21: Poly Idx, 22: Poly Alt, 23: Note Rnd, 24: CC74, 25: ArpSeq, 26: Macro 1, 27: Macro 2, 28: Macro 3, 29: Macro 4, 30: Macro 5, 31: Macro 6, 32: Macro 7, 33: Macro 8, 34: Math 1, 35: Math 2, 36: Math 3, 37: Math 4	0: Off, 1: DCO Env, 2: VCF Env, 3: Amp Env, 4: Aux Env, 5: LFO 1, 6: LFO 2, 7: LFO 3, 8: LFO 4, 9: Vel, 10: Off Vel, 11: AT, 12: Key, 13: Gate, 14: ModWheel, 15: PB, 16: VoiceIdx, 17: VoiceAlt, 18: VoiceRnd, 19: Uni Idx, 20: Uni Alt, 21: Poly Idx, 22: Poly Alt, 23: Note Rnd, 24: CC74, 25: ArpSeq, 26: Macro 1, 27: Macro 2, 28: Macro 3, 29: Macro 4, 30: Macro 5, 31: Macro 6, 32: Macro 7, 33: Macro 8, 34: Math 1, 35: Math 2, 36: Math 3, 37: Math 4

Parameter	Type	CC	NRPN	MSB	LSB	NRPN range	CC range
Maths 4: Source 3	Part		4999	39	7	0: Off, 1: DCO Env, 2: VCF Env, 3: Amp Env, 4: Aux Env, 5: LFO 1, 6: LFO 2, 7: LFO 3, 8: LFO 4, 9: Vel, 10: Off Vel, 11: AT, 12: Key, 13: Gate, 14: ModWheel, 15: PB, 16: VoiceIdx, 17: VoiceAlt, 18: VoiceRnd, 19: Uni Idx, 20: Uni Alt, 21: Poly Idx, 22: Poly Alt, 23: Note Rnd, 24: CC74, 25: ArpSeq, 26: Macro 1, 27: Macro 2, 28: Macro 3, 29: Macro 4, 30: Macro 5, 31: Macro 6, 32: Macro 7, 33: Macro 8, 34: Math 1, 35: Math 2, 36: Math 3, 37: Math 4	0: Off, 1: DCO Env, 2: VCF Env, 3: Amp Env, 4: Aux Env, 5: LFO 1, 6: LFO 2, 7: LFO 3, 8: LFO 4, 9: Vel, 10: Off Vel, 11: AT, 12: Key, 13: Gate, 14: ModWheel, 15: PB, 16: VoiceIdx, 17: VoiceAlt, 18: VoiceRnd, 19: Uni Idx, 20: Uni Alt, 21: Poly Idx, 22: Poly Alt, 23: Note Rnd, 24: CC74, 25: ArpSeq, 26: Macro 1, 27: Macro 2, 28: Macro 3, 29: Macro 4, 30: Macro 5, 31: Macro 6, 32: Macro 7, 33: Macro 8, 34: Math 1, 35: Math 2, 36: Math 3, 37: Math 4

Parameter	Type	CC	NRPN	MSB	LSB	NRPN range	CC range
Maths 4: Source 4	Part		5000	39	8	0: Off, 1: DCO Env, 2: VCF Env, 3: Amp Env, 4: Aux Env, 5: LFO 1, 6: LFO 2, 7: LFO 3, 8: LFO 4, 9: Vel, 10: Off Vel, 11: AT, 12: Key, 13: Gate, 14: ModWheel, 15: PB, 16: VoiceIdx, 17: VoiceAlt, 18: VoiceRnd, 19: Uni Idx, 20: Uni Alt, 21: Poly Idx, 22: Poly Alt, 23: Note Rnd, 24: CC74, 25: ArpSeq, 26: Macro 1, 27: Macro 2, 28: Macro 3, 29: Macro 4, 30: Macro 5, 31: Macro 6, 32: Macro 7, 33: Macro 8, 34: Math 1, 35: Math 2, 36: Math 3, 37: Math 4	0: Off, 1: DCO Env, 2: VCF Env, 3: Amp Env, 4: Aux Env, 5: LFO 1, 6: LFO 2, 7: LFO 3, 8: LFO 4, 9: Vel, 10: Off Vel, 11: AT, 12: Key, 13: Gate, 14: ModWheel, 15: PB, 16: VoiceIdx, 17: VoiceAlt, 18: VoiceRnd, 19: Uni Idx, 20: Uni Alt, 21: Poly Idx, 22: Poly Alt, 23: Note Rnd, 24: CC74, 25: ArpSeq, 26: Macro 1, 27: Macro 2, 28: Macro 3, 29: Macro 4, 30: Macro 5, 31: Macro 6, 32: Macro 7, 33: Macro 8, 34: Math 1, 35: Math 2, 36: Math 3, 37: Math 4
Maths 4: Slew: Rise Time	Part		5032	39	40	0 - 16383	0-127
Maths 4: Slew: Fall Time	Part		5033	39	41	0 - 16383	0-127
Maths 4: Curve: Split	Part		5040	39	48	0 - 16383	0-127
Maths 4: Curve: Shelf	Part		5041	39	49	0 - 16383	0-127
Maths 4: Curve: CurveLo	Part		5042	39	50	0 - 16383	0-127
Maths 4: Curve: CurveHi	Part		5043	39	51	0 - 16383	0-127

Parameter	Type	CC	NRPN	MSB	LSB	NRPN range	CC range
Maths 4: Fold: Min	Part		5048	39	56	0 - 16383	0-127
Maths 4: Fold: Max	Part		5049	39	57	0 - 16383	0-127
Maths 4: Fold: Min Type	Part		5050	39	58	0: Clip, 1: Fold	0: Clip, 1: Fold
Maths 4: Fold: Min Type	Part		5051	39	59	0: Clip, 1: Fold	0: Clip, 1: Fold
Maths 4: Quantize: Quantize	Part		5056	39	64	0 - 16383	0-127
Maths 4: Multi-Via: Via 1	Part		5064	39	72	0: Off, 1: DCO Env, 2: VCF Env, 3: Amp Env, 4: Aux Env, 5: LFO 1, 6: LFO 2, 7: LFO 3, 8: LFO 4, 9: Vel, 10: Off Vel, 11: AT, 12: Key, 13: Gate, 14: ModWheel, 15: PB, 16: VoiceIdx, 17: VoiceAlt, 18: VoiceRnd, 19: Uni Idx, 20: Uni Alt, 21: Poly Idx, 22: Poly Alt, 23: Note Rnd, 24: CC74, 25: ArpSeq, 26: Macro 1, 27: Macro 2, 28: Macro 3, 29: Macro 4, 30: Macro 5, 31: Macro 6, 32: Macro 7, 33: Macro 8, 34: Math 1, 35: Math 2, 36: Math 3, 37: Math 4	0: Off, 1: DCO Env, 2: VCF Env, 3: Amp Env, 4: Aux Env, 5: LFO 1, 6: LFO 2, 7: LFO 3, 8: LFO 4, 9: Vel, 10: Off Vel, 11: AT, 12: Key, 13: Gate, 14: ModWheel, 15: PB, 16: VoiceIdx, 17: VoiceAlt, 18: VoiceRnd, 19: Uni Idx, 20: Uni Alt, 21: Poly Idx, 22: Poly Alt, 23: Note Rnd, 24: CC74, 25: ArpSeq, 26: Macro 1, 27: Macro 2, 28: Macro 3, 29: Macro 4, 30: Macro 5, 31: Macro 6, 32: Macro 7, 33: Macro 8, 34: Math 1, 35: Math 2, 36: Math 3, 37: Math 4
Maths 4: Multi-Via: Via 1 Amount	Part		5065	39	73	0 - 16383	0-127

Parameter	Type	CC	NRPN	MSB	LSB	NRPN range	CC range
Maths 4: Multi-Via: Via 2	Part		5066	39	74	0: Off, 1: DCO Env, 2: VCF Env, 3: Amp Env, 4: Aux Env, 5: LFO 1, 6: LFO 2, 7: LFO 3, 8: LFO 4, 9: Vel, 10: Off Vel, 11: AT, 12: Key, 13: Gate, 14: ModWheel, 15: PB, 16: VoiceIdx, 17: VoiceAlt, 18: VoiceRnd, 19: Uni Idx, 20: Uni Alt, 21: Poly Idx, 22: Poly Alt, 23: Note Rnd, 24: CC74, 25: ArpSeq, 26: Macro 1, 27: Macro 2, 28: Macro 3, 29: Macro 4, 30: Macro 5, 31: Macro 6, 32: Macro 7, 33: Macro 8, 34: Math 1, 35: Math 2, 36: Math 3, 37: Math 4	0: Off, 1: DCO Env, 2: VCF Env, 3: Amp Env, 4: Aux Env, 5: LFO 1, 6: LFO 2, 7: LFO 3, 8: LFO 4, 9: Vel, 10: Off Vel, 11: AT, 12: Key, 13: Gate, 14: ModWheel, 15: PB, 16: VoiceIdx, 17: VoiceAlt, 18: VoiceRnd, 19: Uni Idx, 20: Uni Alt, 21: Poly Idx, 22: Poly Alt, 23: Note Rnd, 24: CC74, 25: ArpSeq, 26: Macro 1, 27: Macro 2, 28: Macro 3, 29: Macro 4, 30: Macro 5, 31: Macro 6, 32: Macro 7, 33: Macro 8, 34: Math 1, 35: Math 2, 36: Math 3, 37: Math 4
Maths 4: Multi-Via: Via 2 Amount	Part		5067	39	75	0 - 16383	0-127

Parameter	Type	CC	NRPN	MSB	LSB	NRPN range	CC range
Maths 4: Multi-Via: Via 3	Part		5068	39	76	0: Off, 1: DCO Env, 2: VCF Env, 3: Amp Env, 4: Aux Env, 5: LFO 1, 6: LFO 2, 7: LFO 3, 8: LFO 4, 9: Vel, 10: Off Vel, 11: AT, 12: Key, 13: Gate, 14: ModWheel, 15: PB, 16: VoiceIdx, 17: VoiceAlt, 18: VoiceRnd, 19: Uni Idx, 20: Uni Alt, 21: Poly Idx, 22: Poly Alt, 23: Note Rnd, 24: CC74, 25: ArpSeq, 26: Macro 1, 27: Macro 2, 28: Macro 3, 29: Macro 4, 30: Macro 5, 31: Macro 6, 32: Macro 7, 33: Macro 8, 34: Math 1, 35: Math 2, 36: Math 3, 37: Math 4	0: Off, 1: DCO Env, 2: VCF Env, 3: Amp Env, 4: Aux Env, 5: LFO 1, 6: LFO 2, 7: LFO 3, 8: LFO 4, 9: Vel, 10: Off Vel, 11: AT, 12: Key, 13: Gate, 14: ModWheel, 15: PB, 16: VoiceIdx, 17: VoiceAlt, 18: VoiceRnd, 19: Uni Idx, 20: Uni Alt, 21: Poly Idx, 22: Poly Alt, 23: Note Rnd, 24: CC74, 25: ArpSeq, 26: Macro 1, 27: Macro 2, 28: Macro 3, 29: Macro 4, 30: Macro 5, 31: Macro 6, 32: Macro 7, 33: Macro 8, 34: Math 1, 35: Math 2, 36: Math 3, 37: Math 4
Maths 4: Multi-Via: Via 3 Amount	Part		5069	39	77	0 - 16383	0-127
Maths 4: Track & Hold: Threshold	Part		5072	39	80	0 - 16383	0-127
Maths 4: Track & Hold: Active	Part		5073	39	81	0: false, 1: true	0: false, 1: true
Maths 4: Crossfade: Crossfade	Part		5080	39	88	0: On, 1: Off	0: On, 1: Off

APPENDIX-E: SEQ: POLY chord list

Chord	Notes	Transposition	Musical Interval
min 2nd	2	Root, +1	1-b2
Maj 2nd	2	Root, +2	1-2
min 3rd	2	Root +3	1-b3
Maj 3rd	2	Root, +4	1-3
4th	2	Root, +5	1-4
Tritone	2	Root, +6	1-b5
5th	2	Root, +7	1-5
min 6th	2	Root, +8	1-b6
Maj 6th	2	Root, +9	1-6
min 7th	2	Root, +10	1-b7
Maj 7th	2	Root, +11	1-7
Octave	2	Root, +12	1-8
Major	3	Root, +4, +7	1-3-5
minor	3	Root, +3, +7	1-b3-5
sus2	3	Root, +2, +7	1-2-5
sus4	3	Root, +5, +7	1-4-5
aug	3	Root, +4, +7	1-3-#5
dim	3	Root, +3, +6	1-b3-b5
Maj7	4	Root, +4, +7, +11	1-3-5-7
min7	4	Root, +3, +7, +10	1-b3-5-b7
7	4	Root, +4, +7, +10	1-3-5-b7
7sus4	4	Root, +5, +7, +10	1-4-5-b7
M add2	4	Root, +2, +4, +7	1-2-3-5
m add2	4	Root, +2, +3, +7	1-2-b3-5
min7b5	4	Root, +3, +6, +10	1-b3-b5-b7
mMaj7	4	Root, +3, +7, +11	1-b3-5-7
dim7	4	Root, +3, +6, +9	1-b3-b5-bb7
7#5	4	Root, +4, +8, +10	1-3-#5-b7

Chord	Notes	Transposition	Musical Interval
Maj7#5	4	Root, +4, +8, +11	1-3-#5-7
Maj7b5	4	Root, +4, +6, +11	1-3-b5-7
mMaj7b5	4	Root, +3, +6, +11	1-b3-b5-7

APPENDIX-F: Trigger Sources

Trigger	Description
NoteOn	Midi note on -message.
NoteOnPt	Midi note on -message per Part.
NoteOff	Midi note off -message.
NteOffPt	Midi note off -message per Part.
LFO 1	LFO 1
LFO 2	LFO 2
LFO 3	LFO 3
LFO 4	LFO 4