



# **MOTHER-32**

---

USER'S MANUAL





“What artists need is an endless resource, full of rough edges and dimly-lit nooks and crannies that one can explore as one sees fit.”

**- Dr. Robert Moog -**

# IMPORTANT SAFETY INSTRUCTIONS

## **WARNING - WHEN USING ELECTRIC PRODUCTS, THESE BASIC PRECAUTIONS SHOULD ALWAYS BE FOLLOWED:**

1. Read all the instructions before using the product.
2. Do not use this product near water - for example, near a bathtub, washbowl, kitchen sink, in a wet basement, or near a swimming pool or the like.
3. This product, in combination with an amplifier and headphones or speakers, may be capable of producing sound levels that could cause permanent hearing loss. Do not operate for a long period of time at a high volume level or at a level that is uncomfortable.
4. The product should be located so that its location does not interfere with its proper ventilation.
5. The product should be located away from heat sources such as radiators, heat registers, or other products that produce heat. No naked flame sources (such as candles, lighters, etc.) should be placed near this product.
6. Do not operate in direct sunlight.
7. The product should be connected to a power supply only of the type described in the operating instructions or as marked on the product.
8. The power supply cord of the product should be unplugged from the outlet when left unused for a long period of time or during lightning storms.
9. Care should be taken so that objects do not fall, and liquids are not spilled, into the enclosure through openings.

*There are no user serviceable parts inside. Refer all servicing to qualified personnel only.*

**NOTE:** This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment to an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

**CAUTION:** Please note that any changes or modifications made to this product not expressly approved by Moog Music, Inc. could void the user's authority granted by the FCC to operate the equipment.

# TABLE OF CONTENTS

## **6 OVERVIEW**

- 8 Unpacking and Inspection
- 8 Setup and Connections
- 9 About Mother-32

## **11 PANEL CONTROLS AND FUNCTIONS**

- 11 VCO (Voltage Controlled Oscillator)
- 12 VCO Modulation
- 13 LFO (Low Frequency Oscillator)
- 13 Mix (Voltage Controlled Mixer)
- 14 VCF (Voltage Controlled Filter)
- 15 VCF Modulation
- 15 EG (Envelope Generator)
- 16 VCA (Voltage Controlled Amplifier)
- 17 Keyboard Overview
- 18 Sequencer Overview and Panel Control
- 19 Swing
- 21 MIDI Input
- 21 VC Mix (Voltage Controlled Mixer/Attenuator)
- 22 Patchbay Overview

## **23 USING THE MOTHER-32 SEQUENCER**

- 24 Tutorial - Creating a Pattern in Keyboard Mode
- 28 Playing the Pattern
- 29 Sequencer Performance Functions
- 30 Keyboard Mode Pattern Editing
  - 31 Saving and Restoring a Pattern
  - 32 Initializing a Pattern and Pattern Location
- 32 Tutorial - Creating a Pattern in Step Mode
- 36 Playing and Editing a Pattern in Step Mode

## **37 SEQUENCER PANEL FUNCTION QUICK REFERENCE**

- 37 Sequencer Memory and Loading a Pattern
- 39 Mode Selection
- 40 Sequencer Controls
- 42 Keyboard Mode Panel Functions
- 44 Step Mode Panel Functions

## **46 CONTROL VOLTAGE OVERVIEW**

## **47 PATCHBAY INPUTS AND OUTPUTS**

- 52 Assignable Output
- 54 Clock/Tempo Overview

## **56 MIDI FUNCTIONS AND IMPLEMENTATION**

## **58 SETUP MODE**

## **61 VCO CALIBRATION**

## **63 USING MOTHER-32 AS A EURORACK MODULE**

## **64 PRESETS**

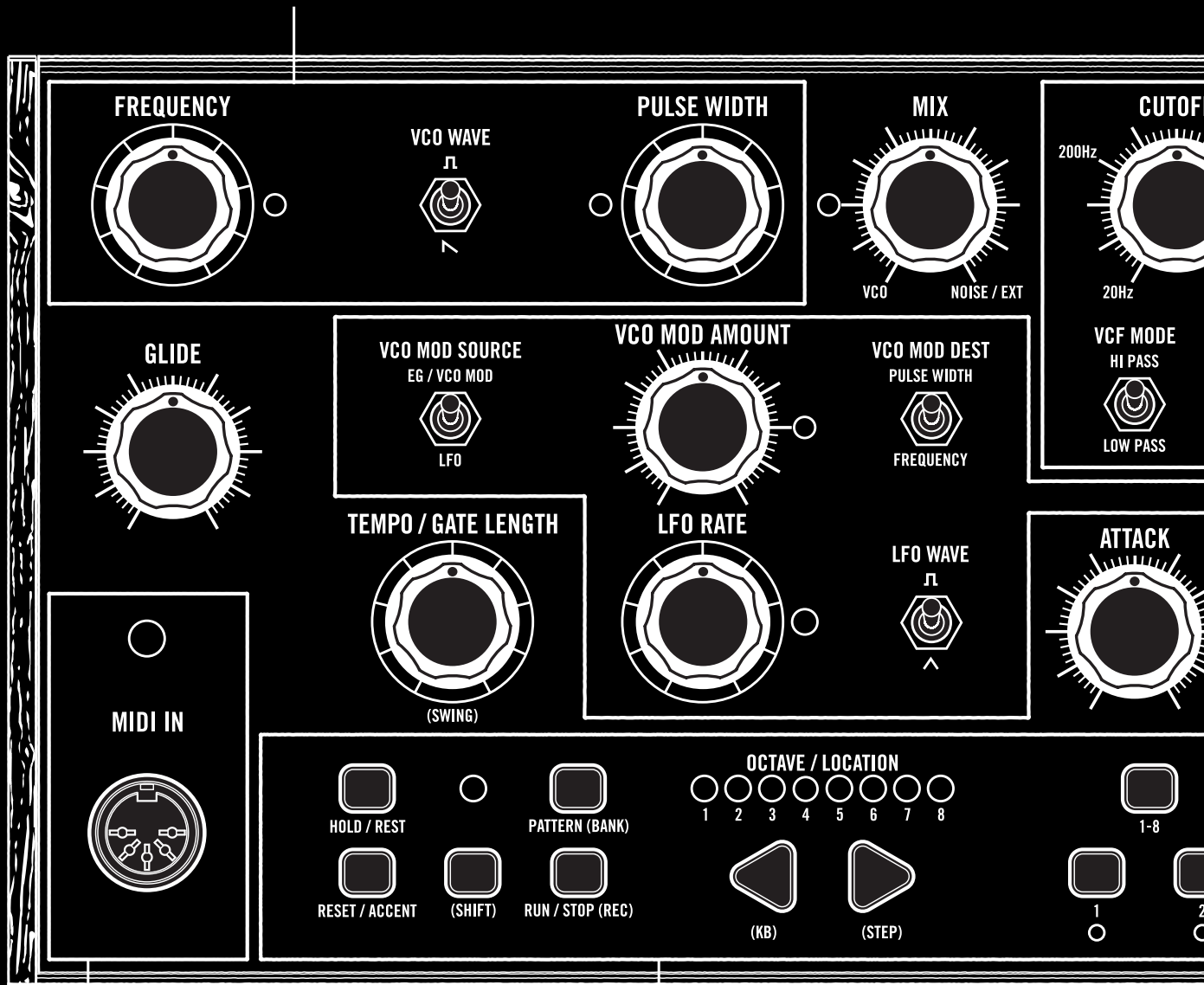
## **70 SPECIFICATIONS**

## **71 SERVICE AND SUPPORT INFORMATION**

- 71 Warranty

## OSCILLATOR (VCO) PAGE 11

Mother-32 features an analog Voltage Controlled Oscillator (VCO) offering either a SAW wave or a PULSE wave (with Pulse Width Modulation / PWM).



### MIDI IN PAGE 21

Receives Note, Clock, CC, and other messages via MIDI. The MIDI LED blinks as MIDI messages are received.

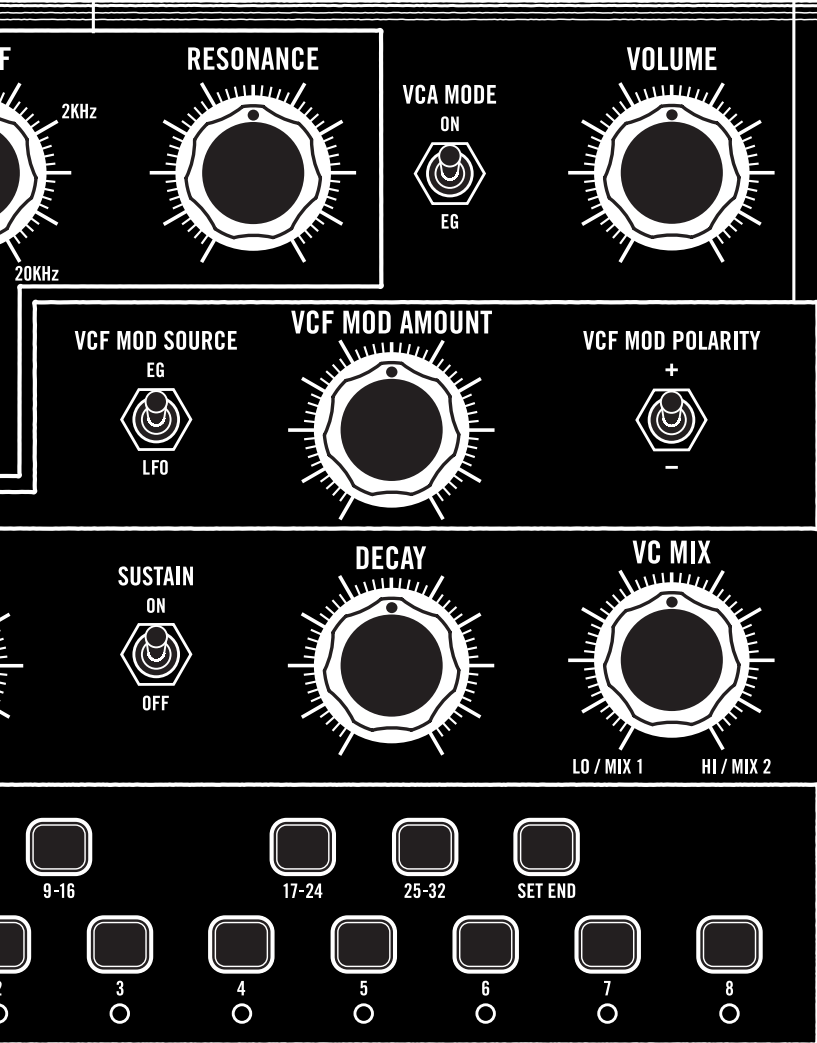
### SEQUENCER CONTROLS

The onboard 32-step sequencer provides 64 pattern locations and two modes: keyboard (KB) and step edit (STEP). To get started quickly use the Keyboard mode tutorial on page 24.

# MOTHER-32

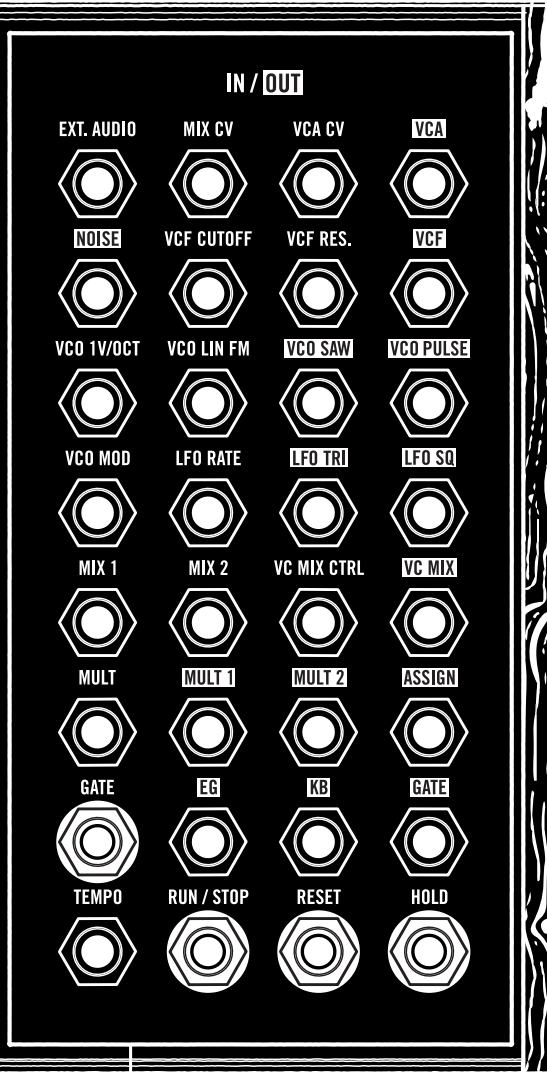
## FILTER (VCF) PAGE 14

The signature Moog sound comes from the analog Voltage Controlled Filter (VCF). This versatile VCF can operate in either the Hi-Pass or Low-Pass mode.



## MODULATION

The Low Frequency Oscillator (LFO), Envelope Generator (EG), and/or an external signal (VCO MOD) can be used to modulate the VCO Pitch, Pulse Width, or VCF Cutoff frequency in varying amounts.



## PATCHBAY PAGE 46

18 input / 14 output patchbay for extended synthesis capabilities and modular connectivity. Patch any output to any input and listen to the effect.



# UNPACKING AND INSPECTION

Check the contents of the shipping carton. Be careful when unpacking your new Moog Mother-32 so that nothing is lost or damaged. We recommend saving the carton and all packing materials in case you ever need to ship the instrument for any reason.

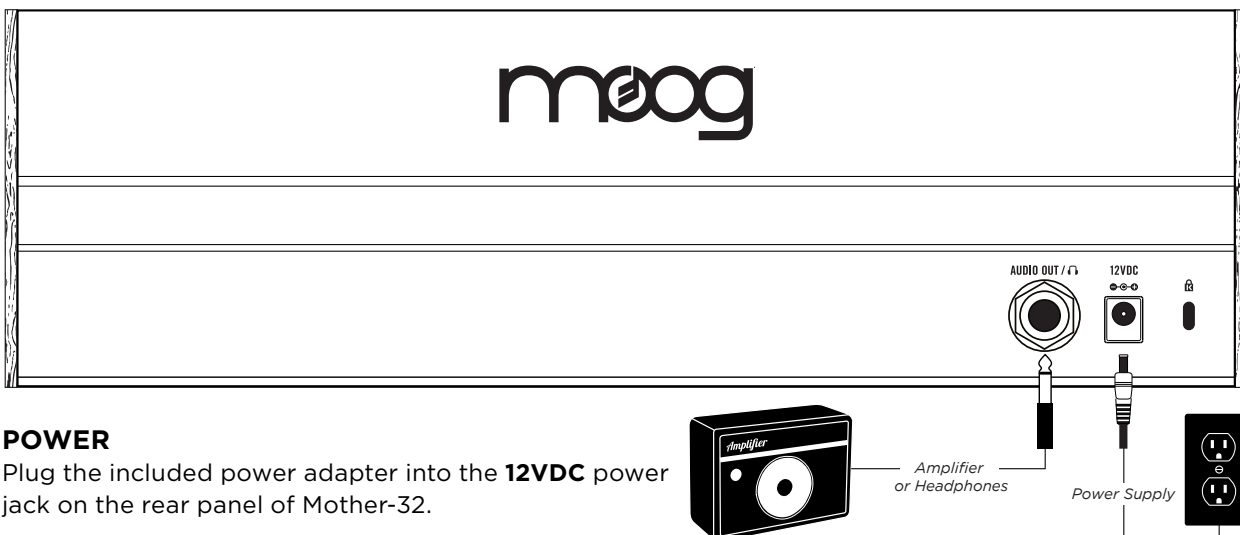
## Mother-32 ships with the following items:

1. Mother-32 Analog Synthesizer
2. Power Supply
3. Owner's Manual
4. Quickstart Guide
5. Calibration Tool
6. Patch Cables
7. Registration Card

## What you will need:

1. Headphones with a 1/4" TRS plug, or a 1/4" TS instrument cable and an amplified speaker
2. A properly wired AC outlet

# SETUP AND CONNECTIONS



## POWER

Plug the included power adapter into the **12VDC** power jack on the rear panel of Mother-32.

**NOTE:** There is no power switch on your Mother-32. Once connected to the power supply, the unit is On. Mother-32 is an analog instrument and should be allowed a few minutes to warm up before use. In cases where it has been left in a cold car overnight, for example, it may take even longer for the oscillator tuning to stabilize. For optimized tuning do not operate your Mother-32 in direct sunlight.

If you are using a 5-pin MIDI cable for external control or sync, connect the **MIDI OUT** of your MIDI controller to the **MIDI IN** on Mother-32. By default, Mother-32 is set to receive MIDI data on MIDI Channel 1.

## AUDIO OUT / 1/4" TRS

With the **VOLUME** knob turned all the way down (counterclockwise), plug one end of a 1/4" instrument cable into the Mother-32 **AUDIO OUT / 1/4" TRS** jack on the rear panel. Then plug the other end into an amplified speaker or mixing console input. This jack can also be used with a set of mono or stereo headphones, providing the same signal to each ear.

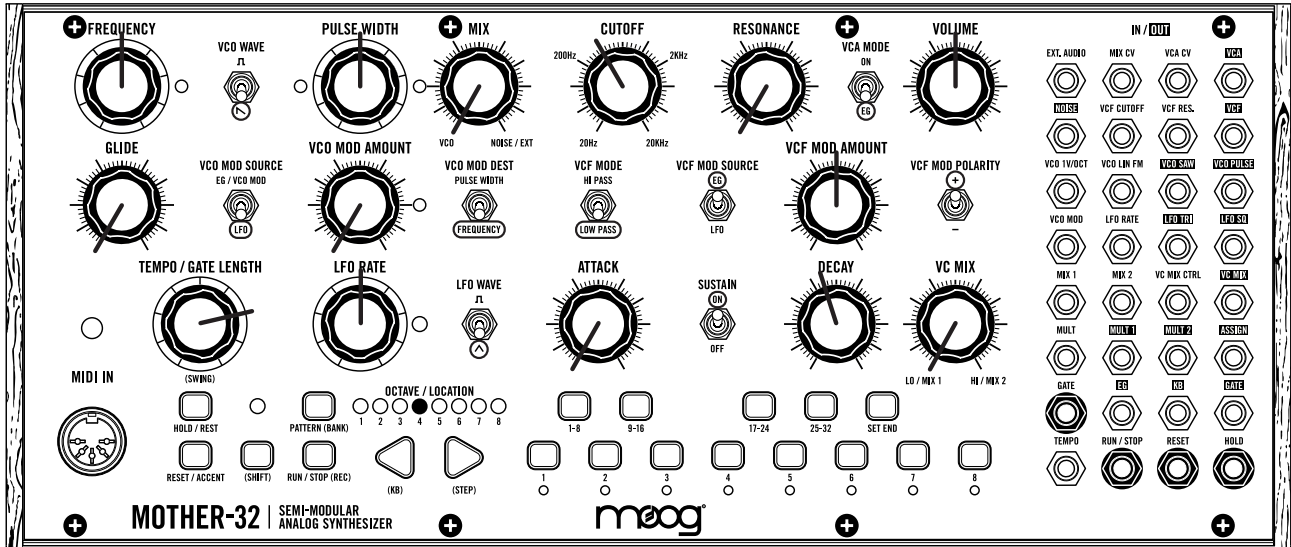
**WARNING:** Do not use a TRS (balanced) cable for line output applications, as this will cause phase cancellation and can produce a very weak signal.

## KENSINGTON SECURITY SLOT

Mother-32 can be securely attached to a fixture by connecting a Kensington security device to this slot.

# ABOUT MOTHER-32

Mother-32 is the ideal foundation for any analog sequencing or compositional studio, as well as a bedrock for live performers. The sound engine is complete and comprehensive, offering prodigious versatility and the signature Moog filter. Building compelling patterns and evolving rhythmic grooves is both easy and addictive. Patterns can be precisely edited and saved, or altered spontaneously while performing. Fully self-contained, the semi-modular Mother-32 can extend its reach to other analog synthesizers, modules, and Eurorack systems via the expansive patchbay, or via the MIDI Input. Mother-32 conforms to the 60HP Eurorack format, with aluminum rails and finished wood side pieces.



### 3 SOUND SOURCES

Mix between the internal VCO and Noise generator, or add audio from an external source.

### RESONANT MOOG FILTER

The signature Moog filter is switchable between Low-Pass (LP) and Hi-Pass (HP) modes.

### EXTENSIVE MODULATION

Select VCO, LFO, or EG sources; PW, FREQ, and CUTOFF destinations.

### DUAL-MODE SEQUENCER

13-keys allows direct entry; Step Mode provides precise control options.

### 64 PATTERN LOCATIONS

Create, edit, save, and recall up to 64 Patterns across 8 Banks.

### GREATER TIMING OPTIONS

Change the Swing Amount, Swing Interval, and Playback Order to create new grooves and feels.

### MODULAR PATCHBAY

Appropriately, Mother-32 offers 32 modular patch points; 18 Inputs, and 14 Outputs.

### VC MIXING

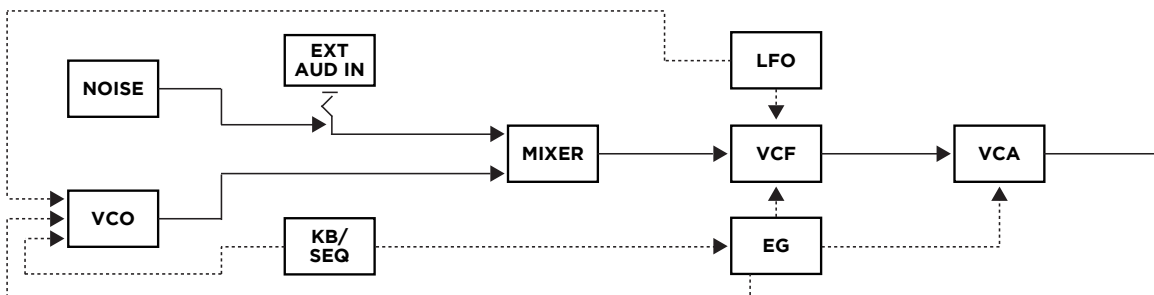
Combine 2 control signals using the VC Mixer; the VC MIX knob can be voltage controlled.

### MIDI INPUT

Connect a MIDI keyboard to enter sequencer notes or to play directly.

## ABOUT MOTHER-32 *(Continued)*

### ANALOG SIGNAL PATH



### SOUND SOURCES

In an analog synthesizer, circuits that generate small electrical vibrations can be used as sound sources. Mother-32 contains one Voltage Controlled Oscillator (VCO) and one White Noise generator, which are internally wired as sound sources. A VCO is a circuit capable of producing a steady tone, which can be made to go up or down in pitch by applying a Control Voltage (CV) to its circuit. A White Noise circuit amplifies naturally occurring electronic noise to make the same type of sound you might hear on a radio tuned in between stations.

The outputs of the VCO and Noise source are routed to a Mixer (MIX) so the two signals can be blended. Note that the **NOISE** output is “normalled” to the **EXT. AUDIO** input jack. This means that, with nothing plugged into this jack, White Noise is the signal blended with the VCO. By plugging an external sound source into the **EXT. AUDIO** input, the White Noise signal is replaced with the external signal. This allows you to blend the VCO with any sound source you like on Mother-32. The output of the Mixer then goes to the input of the Voltage Controlled Filter (VCF).

### SOUND MODIFIERS

Mother-32 operates on the principle of subtractive synthesis. To make a musical electronic sound, you start with a bright, harmonically-rich signal, then circuits called filters and amplifiers are used to transform the original signal into the desired sound. Mother-32 contains both a Voltage Controlled Filter (VCF) and a Voltage Controlled Amplifier (VCA).

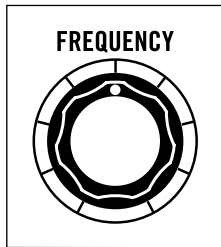
In an analog synthesizer, a filter is a knob used to modify a sound source by making it darker, brighter, or even thinner based on its type, frequency response and filter cutoff frequency. Mother-32 features the classic Moog Ladder Filter topology, with both Low Pass (LOW PASS) and High Pass (HI PASS) frequency responses available. Low Pass means that the Filter removes high frequencies above the Cutoff frequency from the input signal, while High Pass means the Filter removes low frequencies below the Cutoff frequency. In both cases, the **CUTOFF** knob sets the specific frequency for the Filter circuit to start working. In **LOW PASS** mode, the **RESONANCE** knob is used to feed the VCF output signal back to its input, creating a peak in the frequency response at the Filter Cutoff frequency. This can be used to emphasize the harmonics in a sound source by sweeping the Filter Cutoff frequency. The output of the VCF then goes to the input of the VCA.

In an analog synthesizer, an amplifier is a circuit that can change the loudness of a signal. Mother-32 VCA can be set to **ON**, continuously passing the output of the VCF straight through to the instrument's output, or it can be controlled musically from a circuit called an Envelope Generator (EG), which creates a control shape (contour) from a trigger source such as a key being played on a keyboard or a MIDI Note.

The output of the VCA passes to the **VOLUME** knob, which attenuates the output signal at both the **VCA** output and the **HEADPHONE/AUDIO** output.

# PANEL CONTROLS AND FUNCTIONS

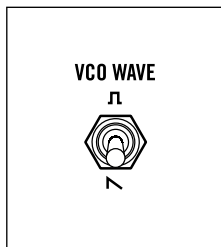
## ■ VCO (Voltage Controlled Oscillator)



### FREQUENCY

This knob is used to tune the pitch of the Oscillator up or down one octave from its center position. This is useful for ensuring that Mother-32 is in tune with other instruments, or can also be used as a live performance control.

**NOTE:** This is an analog control and is calibrated at the factory to provide slightly more than +/-1 octave from center. The maximum and minimum positions will have some variation in the tuning amount over an octave.



### VCO WAVE

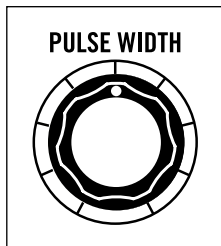
The **VCO WAVE** switch allows you to select between two oscillator waveforms: Sawtooth (Saw) and Pulse. The selected waveform is then routed to the counterclockwise position of the panel **MIX** control. Both Sawtooth and Pulse waveforms have dedicated output jacks on the patchbay.

### PULSE

A pulse wave is a bright waveform that switches between two steady levels. The timbre and harmonics of a pulse wave can be changed by altering the “pulse width” of the wave. Pulse width is the proportion of the wave that is “On” to the proportion that is “Off”, and is usually expressed as a percentage. The thinner the wave, the more the upper harmonics are accentuated. A square wave, for example, is simply a pulse wave with a 50% pulse width. This means that in a single cycle it is on half the time and off half the time.

### SAW

Sawtooth waves are useful for synthesizing bass, simulating brass instruments and creating lead sounds. An unfiltered sawtooth wave is bright and buzzy before filtering, and contains both even and odd numbered harmonics.



### PULSE WIDTH

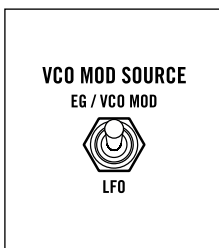
Use this knob to adjust the width of the VCO Pulse wave. This varies from about 2% at the full counterclockwise position to about 98% at the full clockwise position. At mid position a Square wave is output.

The pulse width, or duty cycle of a pulse wave determines its harmonic content. Every pulse width has its own characteristic sound, because each width has a unique harmonic structure. This makes a wide variety of basic timbres possible.

**NOTE:** It is possible to modulate the Pulse wave to 0% or 100% pulse width, which will cause the sound to cut out. This is by design and can be very useful when creating dynamic sounds.

**TIP:** You can listen to both waveforms at the same time by patching the **VCO PULSE** output into the **EXT. AUDIO** input. The **MIX** control now blends between the Saw and Pulse waves. **SAW** must be selected as the **VCO WAVE** on the panel for this to work.

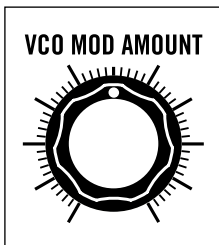
## ■ VCO MODULATION



### VCO MOD SOURCE

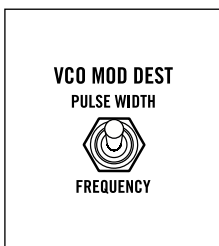
This switch is used to determine whether the LFO, EG or an external modulation source is being sent to the **VCO MOD AMOUNT** control.

**NOTE:** If an external modulation source is patched into the **VCO MOD** input patch point, and **EG/VCO MOD** is selected as your **VCO MOD SOURCE**, only the external modulation signal will be applied to the **VCO MOD AMOUNT** control.



### VCO MOD AMOUNT

This knob determines how much modulation is applied to the selected VCO Mod Destination. Low settings allow for subtle vibrato when applied to Frequency, while medium settings allow for chorus-like effects when applied to Pulse Width.



### VCO MOD DESTINATION

This switch quickly determines whether your modulation source is applied to the Pulse Width of the Pulse wave or to the Frequency (pitch) of the Oscillator.

#### PULSE WIDTH

Slower and subtler use of LFO pulse width modulation can create large, chorus-like bass sounds, while faster rates can be used to create sounds that your ear perceives as two oscillators beating against each other.

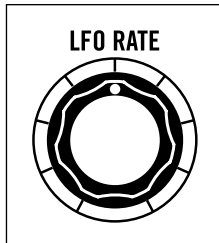
**NOTE:** It is possible to modulate the Pulse wave to 0% or 100% pulse width. This can result in sound cutting in and out, which can be used in a variety of musical ways.

#### FREQUENCY

Subtle LFO pitch modulation of the Oscillator is useful for vibrato or adding motion to a sound, while more extreme pitch modulation can be useful for creating octave jumps or pitched drum sounds.

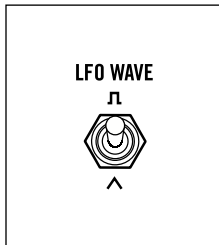
## ■ LFO (Low Frequency Oscillator)

Essentially, an LFO allows you to move a parameter's value up and down automatically. LFOs generate repeating waveforms in the sub-audio range, which are useful for creating repeating effects like pitch vibrato, filter sweeps or pulse width modulation. Mother-32's LFO is also capable of audio-rate modulation, which can be used to add harmonic complexity to any selected destination.



### LFO RATE

This knob is used to determine the LFO's modulation frequency, which ranges from about 0.1Hz to approximately 350Hz. The LFO can reach up to 600Hz if an external control voltage is applied to the **LFO RATE** patchpoint.



### LFO WAVE

The LFO has two available modulation shapes: Square and Triangle. The selected LFO waveshape is automatically transmitted to the **VCO MOD SOURCE** and **VCF MOD SOURCE** selector switches with no patching required.

### SQUARE ⏏

Square waves are useful for crafting trills, multi-octave pitch jumps, mimicking the behavior of a slap delay, or for simply adding an additional rhythmic element to a sequence or held note.

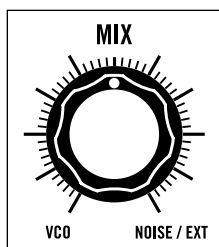
### TRIANGLE ⏏

Triangle waves are useful for creating smooth up and down changes in pitch or pulse width. They are ideal for musical pitch vibrato and pulse width modulation, but can also be used at audio rates for FM sounds.

**NOTE:** The LFO Triangle and Square waveforms both have dedicated output jacks on the patchbay: **LFO TRI** and **LFO SQ**.

**TIP:** By patching the **KB CV** output to the **LFO RATE CV** input, you are able to increase and decrease the LFO Rate based on the pitch of each note played.

## ■ MIX (Voltage Controlled Mixer)



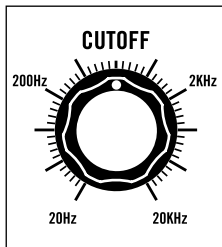
### MIX

Mother-32 has a voltage controlled mixer in the audio path. It is internally routed and AC coupled to receive sound sources, to mix them together, and pass them to the Filter. The **MIX** knob blends the selected VCO waveform (counterclockwise) and an onboard White Noise generator, or signal plugged into the **EXT. AUDIO** input jack (clockwise). The blend can be set manually, or can be dynamically modulated via the **MIX CV** input on the patchbay.

**NOTE:** If a patch cable is plugged into the **EXT. AUDIO** input on the patchbay, it will override the normalization of White Noise to the clockwise position of this mixer. The External Audio input is designed to receive a +/-5V signal. A line level signal will be very weak in volume when compared with the internal VCO.

## ■ VCF (Voltage Controlled Filter)

The Filter is selectable between a classic Moog 24dB/Octave Low Pass Filter with Resonance and a classic Moog 24dB/Octave Hi Pass Filter.

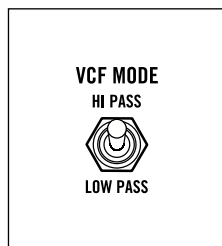


### CUTOFF

Use this knob to change the Filter's Cutoff frequency from 20Hz to 20kHz.

In **LOW PASS** mode, only frequencies below the selected Cutoff frequency are allowed to pass through. Rotating the **CUTOFF** knob clockwise will open the Filter, creating a brighter sound. Turning the **CUTOFF** control to the left will close the Filter, creating a darker and thicker sound.

In **HI PASS** mode, only the frequencies above the selected Cutoff frequency are allowed to pass. Rotating the **CUTOFF** knob counterclockwise will remove low frequency information, creating a bright and cutting sound. Rotating the **CUTOFF** knob counterclockwise allows low frequency information to pass through, creating an extremely bright, aggressive and full sound.



### VCF MODE

This switch selects between **LOW PASS** and **HI PASS** Filter modes.

### LOW PASS

The Low Pass Filter is a traditional Moog 24dB/Octave resonant Ladder Filter. This is the heart of the Moog sound and is ideal for bass sounds and other sounds that mimic melodic acoustic instruments.

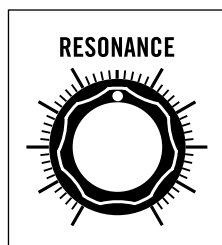
### HI PASS

The Hi Pass Filter is a classic Moog 24dB/Octave non-resonant Ladder Filter. This is useful for bright sounds that cut through a mix, or dynamically removing bass frequencies to thin the sound.

**NOTE:** In **HI PASS** mode, if the **RESONANCE** control is turned up at all, the Hi Pass Filter will **NOT** function fully as this will reintroduce bottom end into a sound, which may or may not be desired.

**TIP:** You can provide resonance in **HI PASS** mode by patching the **VCF** output into the **EXT. AUDIO** input. The **MIX** control then becomes the resonance control for the Hi Pass Filter, even increasing to self-oscillation. For this to work, keep the **RESONANCE** panel knob turned fully counterclockwise.

**TIP:** With the **CUTOFF** control at minimum in **HI PASS** mode, you are basically bypassing the Ladder Filter and passing the output of the mixer straight to the VCA. If you are looking for the pure sound of the VCO, this is a way to get it without patch cords.

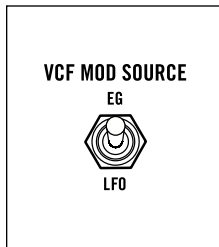


### RESONANCE

The **RESONANCE** knob determines how much signal is routed from the Filter's output back to its input. Rotating this knob clockwise causes a peak in amplitude at the Cutoff frequency. Settings above 3 o'clock will cause the Filter to self-oscillate, allowing the Filter to be used as a sound source.

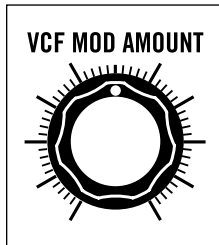
**TIP:** In **LOW PASS** mode, with the **RESONANCE** and **MIX** controls at maximum, the **VCF** can be used as a Sine wave sound source. Simply patch the KB output to the **VCF CUTOFF** input, and plug a dead patch cable (not connected at the other end) into the **EXT. AUDIO** input. Now adjust the Filter **CUTOFF** control to fine-tune your new oscillator.

## ■ VCF MODULATION



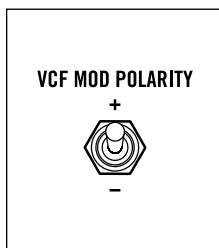
### VCF MOD SOURCE

This switch is used to determine whether the LFO or EG is being sent as a source to the **VCF MOD AMOUNT** knob.



### VCF MOD AMOUNT

This knob determines how much the modulation source changes the Filter Cutoff frequency.



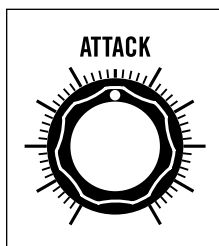
### VCF MOD POLARITY

This switch is used to determine whether the VCF modulation has a positive or negative effect on the Filter Cutoff frequency. For example, instead of using the Attack portion of the EG to boost the Filter Cutoff frequency, inverting the polarity will allow the Attack portion to lower the Filter Cutoff frequency.

**TIP:** When modulating the Filter Cutoff with the **EG** and the **VCF MOD POLARITY** switch set to (+), turn the **CUTOFF** knob down to the minimum desired frequency. In this case, modulation from the EG adds to this setting. When modulating the Filter Cutoff with the EG and the Polarity switch is set to (-), turn the **CUTOFF** knob up to the maximum desired frequency. In this case, modulation from the EG subtracts from this setting.

## ■ EG (Envelope Generator)

Envelope Generators (EGs) create a signal that adds motion to a sound after a note is played. The EG is started by a Gate or MIDI Note On message. Once started, its shape in time is determined by the **ATTACK**, **DECAY**, and **SUSTAIN** knobs.



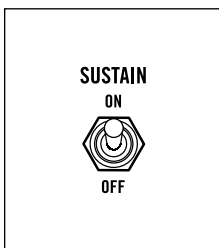
### ATTACK

The **ATTACK** knob is used to specify the time it takes for the Envelope signal to ascend from zero to its maximum level. Fast attacks are useful for creating plucked sounds, while slow attacks are more useful for creating bowed string sounds and swells.

Rotate the **ATTACK** knob counterclockwise for faster attack times, and clockwise for slower attack times.



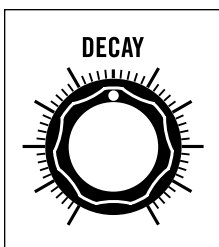
## EG (Envelope Generator) *(Continued)*



### SUSTAIN

With the **SUSTAIN** switch in the **ON** position, the Envelope signal will hold at its maximum level for the duration a note is held, similar to an organ. With the **SUSTAIN** switch in the **OFF** position, the Attack stage immediately moves to the Decay stage when complete, or when a note is released depending on which occurs first.

**NOTE:** When the **SUSTAIN** switch is set to **ON**, overlapping notes from the Keyboard or MIDI notes do not retrigger the EG, allowing legato phrasing. When the **SUSTAIN** switch is set to **OFF**, each note played on the Keyboard or MIDI note retriggers the EG.



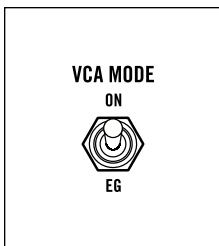
### DECAY

The **DECAY** control specifies the time it takes for the Envelope to descend from its current or maximum level to zero. Fast decay times are useful for creating punchy staccato notes, while longer decay times allow a note to ring out or fade away slowly.

Rotate the **DECAY** knob counterclockwise for faster decay times, and clockwise for longer decay times.

## ■ VCA (Voltage Controlled Amplifier)

A VCA is used to dynamically control the volume. It either follows a volume curve determined by your EG settings, or is set to **ON**, which causes the VCA to remain fixed at its maximum value.



### VCA MODE

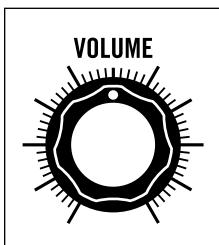
This switch determines whether the VCA is modulated by the Envelope or is simply held at its maximum level.

#### ON

When set to **ON**, Mother-32's audio signal is allowed to pass without the need for a Gate or note **ON** message to occur. This is ideal for drones and continuously evolving modulated sounds, but is also useful for eliciting new behavior and sounds from an existing sequence.

#### EG

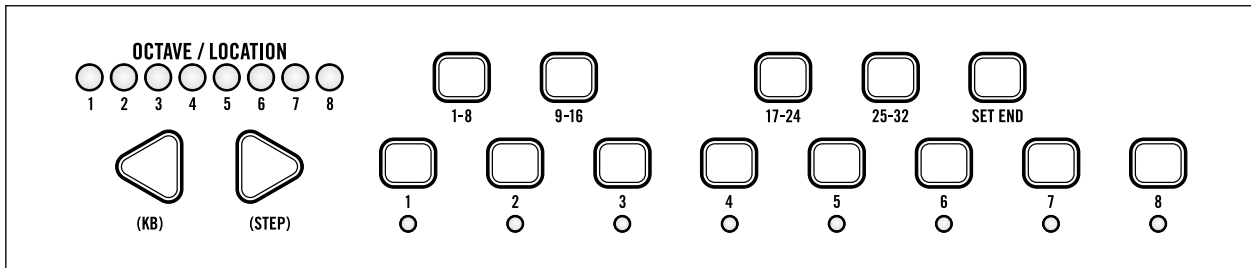
The EG setting is ideal in most applications. This uses the curve of the Envelope Generator to add dynamic characteristics to a sound, which can be used for everything from slow volume swells to snappy plucked sounds.



### VOLUME

Adjusts the main output level for both the patchbay VCA output, and 1/4" **AUDIO/HEADPHONE** output on the back of Mother-32. Rotating the control fully clockwise produces the maximum output. Rotating the control fully counterclockwise silences the instrument.

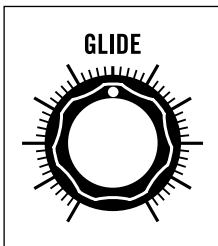
## ■ KEYBOARD OVERVIEW



### KEYBOARD

Mother-32 has a single-octave 13-note keyboard with arrow-shaped left **(KB)** and right **(STEP)** buttons used for selecting the octave of the keyboard. There are 8 available octave settings, indicated by 8 **OCTAVE / LOCATION** LEDs lit red. The keyboard is also used to access a number of sequencer functions.

**NOTE:** There are two performance modes for the keyboard and octave buttons: Keyboard mode and Step mode. They determine how these buttons interact with the Sequencer. Details of these operational modes can be found in the Sequencer section of this manual. The default mode on power up is Keyboard Mode.



### GLIDE

Glide, also called portamento or glissando, is used to generate smooth changes between notes. Glide is applied to notes generated from the Keyboard, MIDI notes, or the Sequencer. The **GLIDE** knob determines the amount of time it takes for the VCO to transition from one pitch to the next.

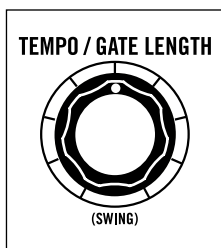
## ■ SEQUENCER OVERVIEW AND PANEL CONTROL

Mother-32 contains a monophonic step sequencer. The Sequencer stores a list of single notes and expression information, called a pattern, that can be played back in a loop. As a pattern plays back, the Sequencer advances through each step and outputs a new note every time a step is reached. Each pattern can contain up to 32 Steps, and is easily stored in one of 64 available pattern locations. Patterns are arranged in 8 Banks of 8 patterns each.

The Sequencer directly controls the pitch of the VCO and triggers the EG. Control outputs driven by the sequencer are the **KB CV** output, the **GATE** output and the **EG** output. Accent signals are routed internally to the VCF and VCA at a fixed level.

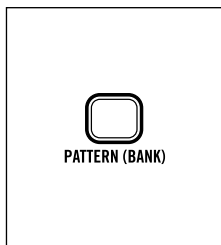
### SEQUENCER PANEL CONTROLS

For full details of sequencer panel control operations, please refer to the “Using the Mother-32 Sequencer” section of this manual on page 23.



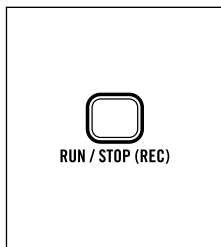
#### TEMPO/GATE LENGTH

The **TEMPO** knob determines the tempo of the Sequencer. Tempo is indicated by the Tempo LED located directly above the **(SHIFT)** button. When programming Steps in a pattern, this control is used to set the Gate Length for each Step. Gate Length determines how long each note is held in reference to the entire duration of its Step.



#### PATTERN (BANK)

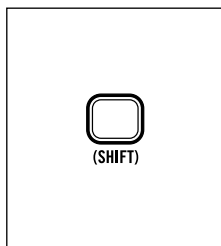
This button is used to view the currently active pattern location, or select a new pattern. While holding the **(SHIFT)** button, it is used to view the current Bank containing 8 patterns, or select a new Bank.



#### RUN/STOP (REC)

This button is used to start the Sequencer, and to stop it. Pressing **SHIFT + RUN/STOP (REC)** will initiate the Record function while in Keyboard mode.

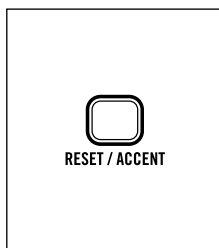
**NOTE:** Holding **(SHIFT) + (REC)** for over a second will start the saving process.



#### (SHIFT)

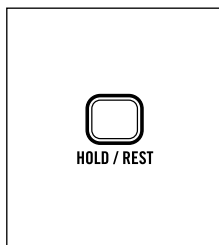
When pressed and held, this button is used in conjunction with other buttons to perform various functions.

## SEQUENCER PANEL CONTROLS *(Continued)*



### RESET/ACCENT

When the Sequencer is running, this button is used for resetting the step location of a pattern to Step 1. When editing a step it is used to enable or disable an Accent output.



### HOLD/REST

When the Sequencer is running, this button is used for repeating the current step at the current tempo as long as it is held down. When editing a step it is used for enabling or disabling a Rest.

## ■ SWING

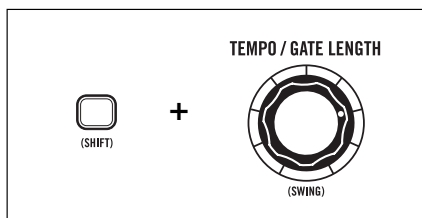
### SHIFT FUNCTIONS: SWING AMOUNT AND RATCHET

The sequencer functions of Swing Amount and Ratchet are accessed by pressing **(SHIFT) +** rotating the **TEMPO** knob for varying the Swing Amount, or by pressing **(SHIFT) +** rotating the **GLIDE** knob for setting Ratchet values. Swing Amount sets a percentage that the off beats are ahead or behind the beat. Ratchet specifies a number (1-4) of note-repeats occurring during the length of a single step.

***NOTE:** When **(SHIFT)** is released after modifying Swing or Ratchet values, the position of the **GLIDE** and **TEMPO** knobs may not match their actual current values. As these knobs are moved, the actual value chases the current position of the knob until it catches up.*

### HOW SWING WORKS GENERALLY (AND ON MOTHER-32)

Generally speaking, Swing involves alternating between rushing and dragging the speed of playing relative to the tempo, creating a pattern of alternating longer and shorter notes. Here we refer to these two alternating phases of Swing as the “onbeat” and the “offbeat.”



### SWING AMOUNT

The Swing Amount controls the relative duration of the on beat versus the offbeat; this is adjusted by holding **SHIFT** and rotating the **TEMPO / GATE LENGTH (SWING)** knob. With Swing Amount at 50% (12:00 on the **TEMPO** knob), timing is precisely aligned with the clock and there is no audible swing feel. As Swing Amount is adjusted clockwise from 12:00, the on beat is stretched out to be longer and the offbeat is compressed to be correspondingly shorter. If swing is adjusted counterclockwise from 12:00 (less than 50%), then the on beat is compressed, and the offbeat starts sooner (before the beat) and lasts correspondingly longer.

## SEQUENCER PANEL CONTROLS *(Continued)*

### THE SWING INTERVAL

The Swing Interval sets the interval, using musical note-length values, used to alternate between the on beat and the offbeat. The speed of the on beat versus the speed of the offbeat is proportional; as you slow one down, the other speeds up, so that an on beat plus an offbeat always takes the same total amount of total time (two Swing Intervals). Because of this, every other Swing Interval is aligned with the underlying clock. The on beat always aligns with the clock; the offbeat can start earlier or later relative to the clock tempo, depending on the Swing Amount.

In the vast majority of sequencers, the Swing Interval is fixed to match the rate of the sequencer, i.e. every other step alternates back and forth between long swung beat and short swung beat. This is depicted in the diagram below.

	1	2	3	4	5	6	7	8
BEAT	X		X		X		X	
STEP INTERVAL: 1/8	1	2	3	4	5	6	7	8
SWING INTERVAL: 1/8								
ON/OFFBEAT IF SWING AMT 66%								
SEQUENCER STEPS IF SWING 66%	1	2	3	4	5	6	7	8

The following diagram shows an example where the Step Interval is eighth notes, and the Swing Interval is eighth note triplets.

	1	2	3	4	5	6	7	8
BEAT	X		X		X		X	
STEP INTERVAL: 1/8	1	2	3	4	5	6	7	8
SWING INTERVAL: 1/8 TRIPLET								
ON/OFFBEAT IF SWING AMT 66%								
SEQUENCER STEPS IF SWING 66%	1	2	3	4	5	6	7	8

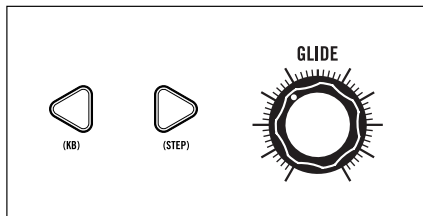
Experiment with different combinations of Swing Interval divisions and Swing % to advance the sequencer in new and interesting ways!

### HERE ARE THE AVAILABLE SWING INTERVAL VALUES:

- |    |                    |                             |
|----|--------------------|-----------------------------|
| 1. | Two whole notes    | (dotted, triplet, straight) |
| 2. | Whole note         | (dotted, triplet, straight) |
| 3. | Half note          | (dotted, triplet, straight) |
| 4. | Quarter note       | (dotted, triplet, straight) |
| 5. | Eighth note        | (dotted, triplet, straight) |
| 6. | Sixteenth note     | (dotted, triplet, straight) |
| 7. | Thirty-second note | (dotted, triplet, straight) |
| 8. | Sixty-fourth note  | (dotted, triplet, straight) |

## SEQUENCER PANEL CONTROLS *(Continued)*

### HERE IS HOW TO ACCESS THE SWING INTERVAL VALUES:



#### **DOTTED NOTES**

Hold down the **(KB)** button while rotating the **GLIDE** knob to select one of the eight dotted note values.

#### **TRIPLET NOTES**

Hold down the **(STEP)** button while rotating the **GLIDE** knob to select one of the eight triplet note values.

#### **STRAIGHT NOTES**

Hold down both the **(KB)** and **(STEP)** buttons while rotating the **GLIDE** knob to select one of the eight straight note values.

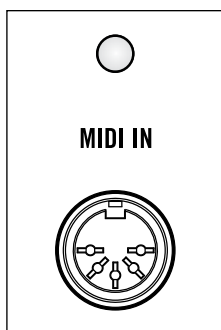
**NOTE:** The selected clock division will be shown in green using the **OCTAVE / LOCATION LEDs**.

**NOTE:** The Swing Amount and Swing Interval are stored per pattern.

**NOTE:** A step will play for a duration determined by the current Swing Interval and Swing Amount settings. If the on-beat Swing Interval ends in the middle of a step, the step will complete its remaining duration at the rate of the off-beat Swing Interval, and vice versa.

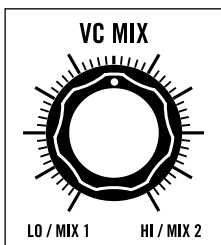
**TIP:** To initialize the Swing Amount and Swing Interval to default values, first set or reset your Sequencer Clock Division (this will also reset your Swing Interval), then press **SHIFT** + rotate the **TEMPO** knob to 12 o'clock for a 50% Swing Amount. Alternatively, initializing or reloading the pattern is a quick way to reset Swing settings, but these are destructive actions, so be sure you aren't losing any work since your last save!

## ■ MIDI INPUT



Mother-32 has a 5-pin DIN MIDI input that allows for external MIDI control, MIDI clock sync, MIDI to CV conversion and firmware updates. When MIDI information is being received, the **MIDI IN** LED will flash red. Details of the MIDI implementation are contained in the "MIDI Functions and Implementation" section of this manual on page 56.

## ■ VC MIX (Voltage Controlled Mixer/Attenuator)

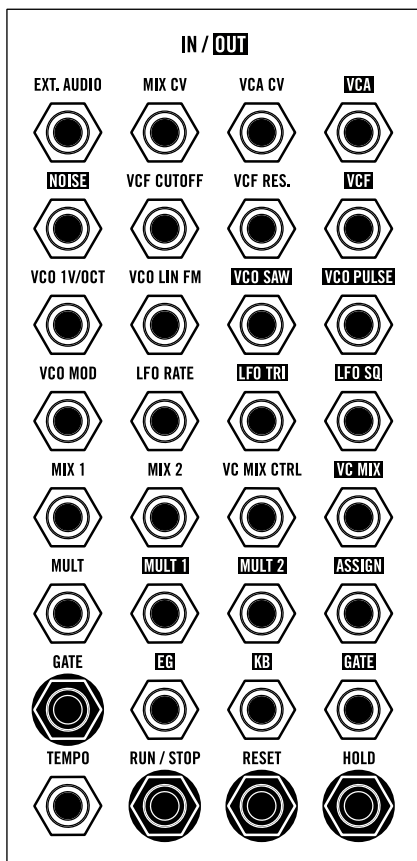


This is a DC-coupled, patchable, voltage-controlled mixer/attenuator that allows two different CV or audio signals to be blended together, modulated, and then patched to a new location. The VC Mixer is directly connected to the **MIX 1**, **MIX 2**, **VC MIX CONTROL** and **VC MIX** inputs. Mix 1 is normalled to 0V and Mix 2 is normalled to a +5V source. This enables the use of this module as a voltage source, an attenuator, a VCA, or a Mixer. It is not internally connected to Mother-32 synthesizer functions, and requires patch cables for use.

## SEQUENCER PANEL CONTROLS *(Continued)*

### ■ PATCHBAY OVERVIEW

The patchbay contains 32 x 3.5mm patch points, which allow for extended synthesis capabilities and modular interconnectivity. For a full description of each patch point go to page 47.



#### AVAILABLE INPUTS

External Audio, Mix CV, VCA CV, VCF Cutoff, VCF Resonance, VCO 1V/Octave, VCO Linear FM, VCO Modulation, LFO Rate, Mix 1, Mix 2, VC Mix Control, Multiple, Gate, Tempo, Run/Stop, Reset and Hold.

#### AVAILABLE OUTPUTS

VCA, Noise, VCF, VCO Saw, VCO Pulse, LFO Triangle, LFO Square, VC Mix, Multiple 1, Multiple 2, Assign, EG, KB, Gate.

#### ASSIGNABLE OUTPUT

The output labeled “**ASSIGN**” is a multipurpose control output for selecting from a number of available functions. The default output is the Clock signal from the Sequencer.

To learn more about the capabilities of the Assignable output jack, go to page 52.

# USING THE MOTHER-32 SEQUENCER

## ■ BASIC CONCEPTS

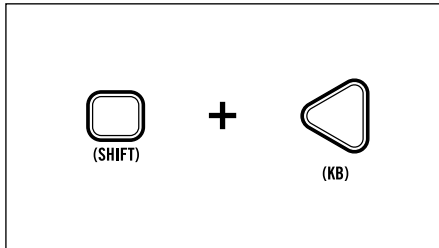
A sequencer is used to play notes or rests on a synthesizer from a pattern in memory, typically at a steady tempo. Each note or rest in the pattern is called a “step”.

On each step, the sequencer outputs a CV signal to control the VCO, a Gate signal to trigger the EG, and if desired, an Accent signal which modulates the VCF and VCA for emphasizing notes. Other than that, the sound you hear from Mother-32 when using the sequencer is determined by the front panel controls and any patch cables in use on the patchbay.

Each pattern can be up to 32 Steps in length, and up to 64 patterns can be stored in memory.

## ■ SEQUENCER MODES

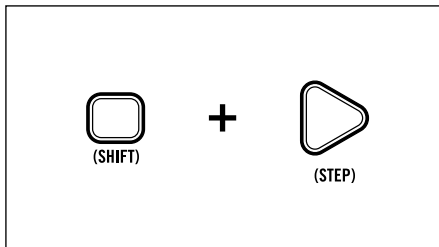
The Mother-32 sequencer has two modes of operation: **KB** (Keyboard) and **STEP** (Step Edit).



### **KB MODE (DEFAULT)**

KB mode is for playing directly from the panel, entering/editing notes in a pattern using the Record function, and transposing patterns during Sequencer playback.

Press **(SHIFT) + (KB)** to select KB mode.



### **STEP MODE**

Step mode is for interacting with a pattern by enabling, muting and editing steps, even during playback.

Press **(SHIFT) + (STEP)** to select Step mode.

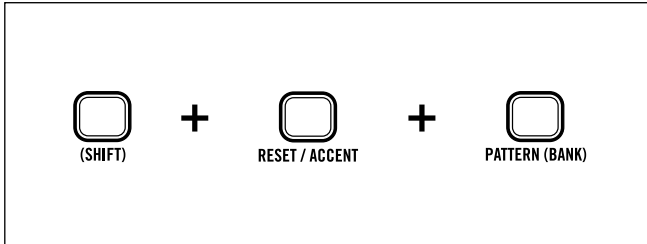
Both modes work with any pattern, and modes can be changed at any time.

**NOTE:** *If you are new to sequencers, use KB mode and its Record function to get started.*



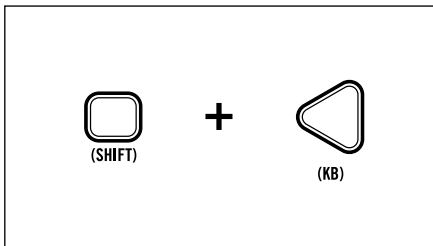
# TUTORIAL - CREATING A PATTERN IN KEYBOARD MODE

This is a tutorial that will walk you through the sequencing capabilities of your Mother-32 in KB mode. Keyboard mode is the best place to start when learning to use the Sequencer. Before starting, disconnect any patch cables and set all controls to the default positions found on page 9.



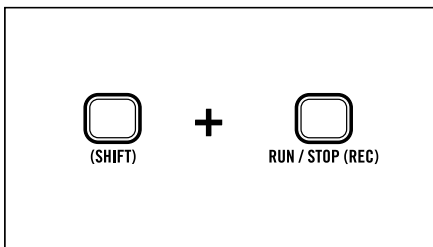
## INITIALIZE THE CURRENT PATTERN

Press **(SHIFT) + RESET + PATTERN** simultaneously to initialize the current pattern.



## NOW ENTER KEYBOARD MODE

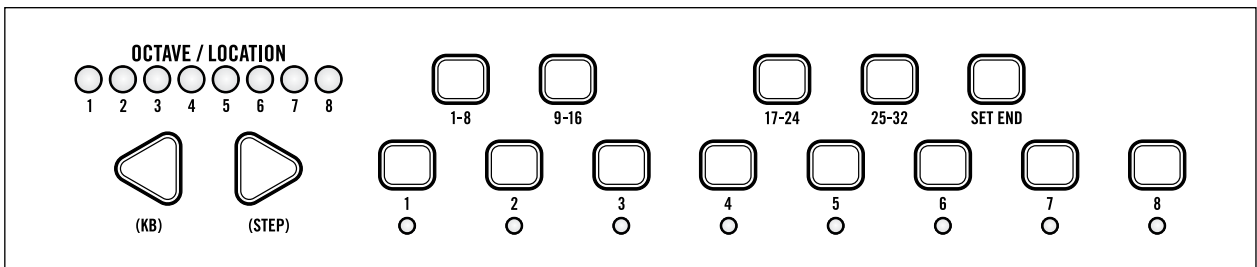
Press **(SHIFT) + KB** to enter Keyboard mode.



## START RECORDING

Press **(SHIFT) + (REC)**. The Tempo LED will change to solid yellow indicating the Record mode function is active and the internal clock is paused. **OCTAVE / LOCATION LED 1** is lit green, indicating you are on Page 1 of the pattern. Step LED 1 is blinking (Step LEDs are located directly below Step buttons 1-8). During the Record function, the current step being edited blinks.

## ENTER A NOTE

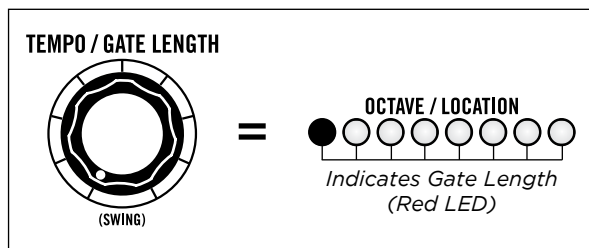


Select an octave by pressing the arrow-shaped **(KB)** or **(STEP)** button. Now play just one note on the Keyboard. *Step LED 1 will continue to blink, meaning you are still editing the first step.*

While the Step LED is blinking, you can modify any of the other parameters for that step including Gate Length (note duration), Accent, Rest, Tie, Glide On/Off and Ratchet count.

**NOTE: OCTAVE / LOCATION LEDs 5-8 indicate respectively, Glide On/Off, Ratchet, Accent and Rest parameters, all of which are defined per-step.**

## CREATING A PATTERN IN KB MODE *(Continued)*

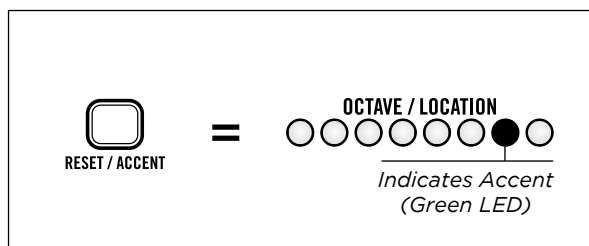


### SET THE GATE LENGTH

Set the **GATE LENGTH** knob to the full counterclockwise position. The **OCTAVE / LOCATION LEDs** temporarily light red to indicate the current Gate Length.

Gate Length is set per-step and determines the duration that a note is held relative to the length of its step (from 1/8 - 8/8). Short durations (counterclockwise) can be used to create staccato notes, while the longest duration (clockwise) acts as a “Tie”. This means that a note is held through to the next step.

**IMPORTANT:** Make sure the **SUSTAIN** switch is set to **ON** for different Gate Lengths to sound correctly.

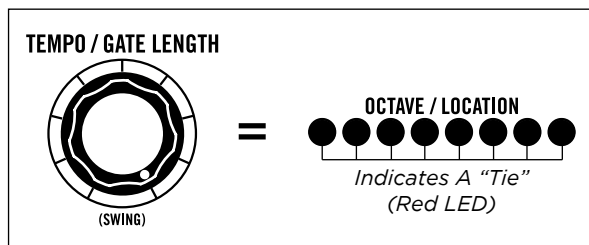


### ADD AN ACCENT TO STEP 1

Press the **ACCENT** button to add a brief volume and brightness emphasis to any step. In this case it is on Step 1. **OCTAVE / LOCATION LED 7** will light green to indicate that an Accent has been added to this step.

### PATTERN STEP 2

Select a new octave by using the arrow-shaped (**KB**) or (**STEP**) buttons. Now play just one note on the Keyboard. *Step LED 2* is now flashing, indicating that it is being edited. *Step LED 1* is now lit solid, indicating that its values have been entered into the active pattern. This is called “Step-Write” behavior and means that any time you play a note or enter a Rest, the step is automatically advanced.



### TIE STEP 2 TO STEP 3

Rotate the **GATE LENGTH** control fully clockwise. All 8 **OCTAVE / LOCATION LEDs** light red indicating maximum Gate Length or a “Tie”. If the note value of Step 3 is the same as Step 2, then the note is held through the step transition. If the note value of Step 3 is different, the note is still held through the transition, but the effect is a legato phrase.

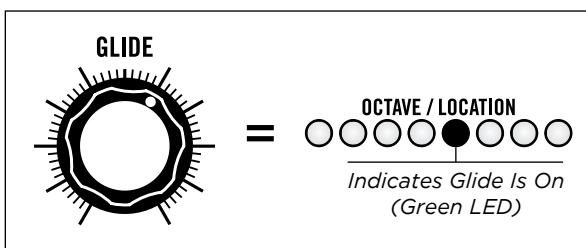
**TIP:** A Tie to a new note may also be created by entering the next note while holding the current note, as if playing legato.

### PATTERN STEP 3

Enter a new note that is different from Step 2. Step LED 3 is blinking, and the previous Step LEDs are lit solid.

Now rotate the **GATE LENGTH** knob counterclockwise for minimum note duration.

## CREATING A PATTERN IN KB MODE *(Continued)*



### TURNING GLIDE ON/OFF

To turn Glide **ON** for a step, simply rotate the **GLIDE** knob in the clockwise direction. **OCTAVE / LOCATION LED 5 is lit green indicating Glide is turned ON for the current step.** To turn Glide **OFF** for a step, simply rotate the **GLIDE** knob to the fully counterclockwise position.

**NOTE:** *Glide rate is not set per-step and is always determined by the front panel **GLIDE** control.*

### ADDING A SLIDE TO STEP 3

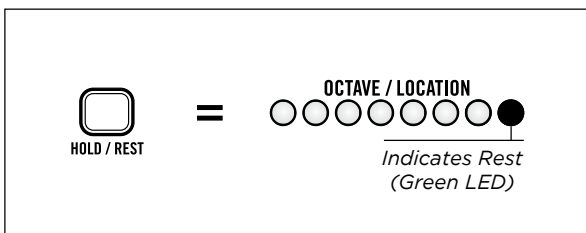
To set up a slide, the starting step must be set to maximum Gate Length, or a "Tie" (you already did this on Step 2).

Now turn Glide **ON**. *Step 3 is the target of the slide in this case.*

### PATTERN STEP 4

Play any note on the keyboard. *Step LED 4 is blinking, and the previous Step LEDs are lit solid.*

**NOTE:** *When you enter a note, the Gate Length is updated from the previous step. This is useful if you are entering a pattern with steps that all have the same Gate Length. In that case you would only need to set the Gate Length when first entering a pattern.*



### PATTERN STEP 5

Do not play a new note.

### ENTER A REST FOR STEP 5

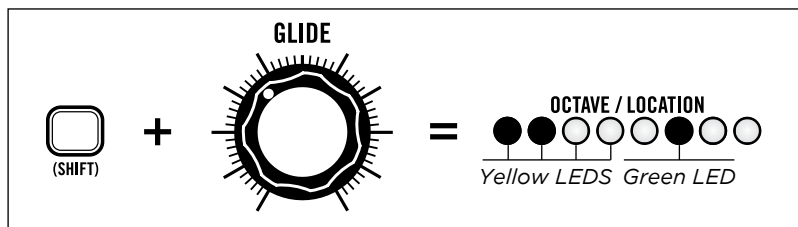
Press **REST**. *Step LED 5 is blinking, and the previous Step LEDs are lit solid. The **OCTAVE / LOCATION LED 8 is also lit green, indicating that a Rest has been entered on this step.***

### PATTERN STEP 6

Select a new octave by using the arrow-shaped (**KB**) or (**STEP**) buttons. Now play just one note on the keyboard. *Step LED 6 is blinking and the previous Step LEDs are lit solid.*

## CREATING A PATTERN IN KB MODE *(Continued)*

### ADD A RATCHET TO STEP 6



Hold **(SHIFT)** while rotating the **GLIDE** knob. **OCTAVE / LOCATION** LEDs 1-4 will temporarily light yellow, indicating the number of Ratchets (repeats) in the current step. Select a value of 2, which will produce 2 notes during the step (up to 4 can be selected). **OCTAVE / LOCATION** LED 6 is lit green to indicate a Ratchet value greater than 1.

**NOTE:** Ratcheted steps are easier to hear if their Gate Length is set to a lower value.

### TIE PATTERN STEPS 7 & 8

Play one note on the keyboard. Step LED 7 is blinking and the previous Step LEDs are lit solid.

Rotate the **GATE LENGTH** knob to the full clockwise (maximum) position.

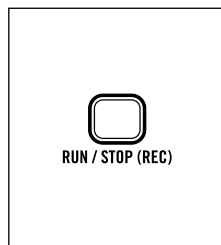
Play the same note you entered for Step 7 again. By tying from the previous step, this will create a note of longer duration than a single step.

Now, rotate the **GATE LENGTH** knob to select a value of 4, so that the 8th step is not tied to the following step.

You can stop here or enter up to 32 steps into a pattern. If you enter more steps, **OCTAVE / LOCATION** LED 2 will light green, indicating you are on Page 2, while the Step LEDs indicate Steps 9 to 16.

**OCTAVE / LOCATION** LED 3 indicates Page 3 and Steps 17-24. **OCTAVE / LOCATION** LED 4 indicates Page 4 and Steps 25-32.

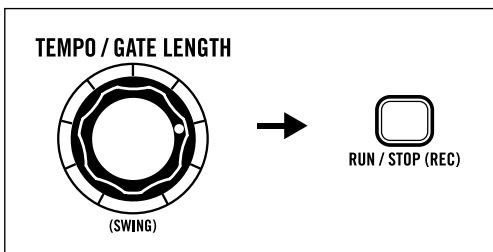
**NOTE:** If the red **OCTAVE / LOCATION** LED and the green Page LED are on the same LED, it will blink between green and red to indicate both the Page and octave.



### STOP RECORDING

When you have completed your pattern, press **RUN/STOP** to exit the Record mode function. The Tempo LED will blink red indicating the internal clock is running again.

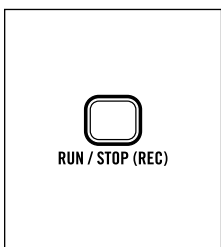
## ■ PLAYING THE PATTERN



### PLAY THE PATTERN

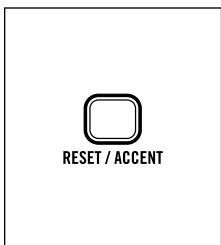
Adjust the **TEMPO** knob to the speed you want, and press **RUN/STOP**.

The Sequencer will advance through each step in the pattern. When it reaches the end, it loops around to Step 1. *The current step being played is indicated by the corresponding Step LED being lit.*



### PAUSE THE PATTERN

To pause a pattern at the last step played, press **RUN/STOP**. Pressing **RUN/STOP** again will resume playback from the next step in the pattern.



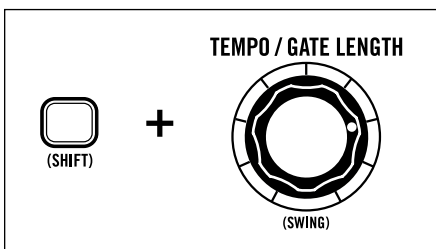
### RETURN THE PATTERN TO STEP ONE

To return a pattern to Step 1 at any time, simply press **RESET**.



### HOLD THE CURRENT STEP/NOTE

Press **HOLD** during sequencer playback to pause the advance of a pattern. The current step will be repeated at the current tempo for as long as this button is held.



### SWING AMOUNT

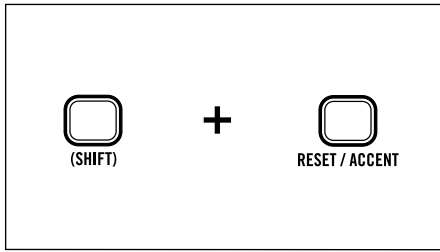
While holding **(SHIFT)**, rotate the **TEMPO (SWING)** knob to add a Swing Amount to the current pattern. The range is from -100% to 100%. When **SWING** is set to a value between -100% and 0, it will move the off-beats earlier in time. At -100% swing, only the off-beats will play.

When **SWING** is set to a value between 0 and 100%, it will move the on-beats later in time. At 100% swing, only the on-beats will play. When **SWING** is set to 0 (center position), no Swing is applied and all notes are played with equal timing.

**NOTE:** The Swing Interval is set independent of the Swing Amount. Please refer to the **SWING** section on page 19 for details.

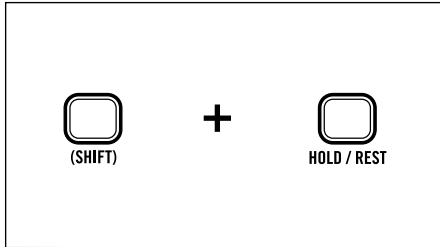
**NOTE:** The Swing Amount and Swing Interval values are stored per pattern.

## ■ SEQUENCER PERFORMANCE FUNCTIONS



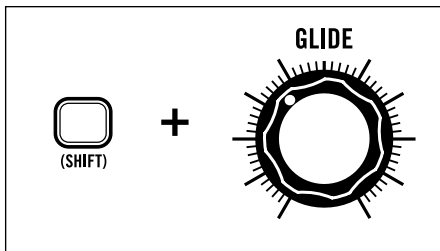
### LIVE ACCENT

Press **(SHIFT) + ACCENT** during playback to temporarily add an Accent to each step in a pattern. Live Accent overrides stored Accent data and is only active when both buttons are held. Live Accent data is not stored in memory.



### LIVE MUTE

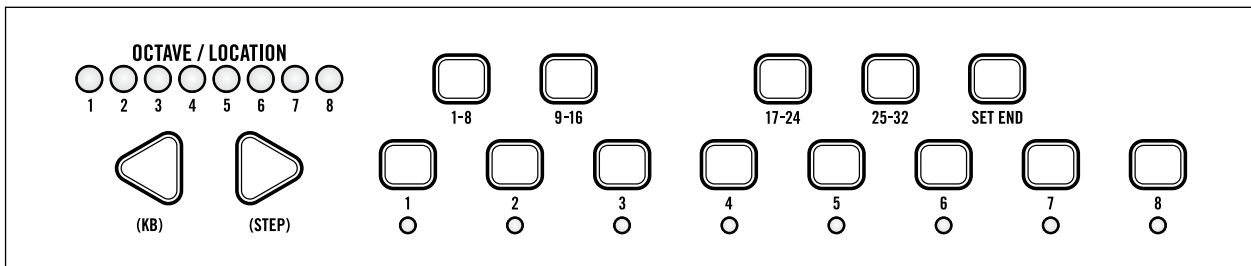
Press **(SHIFT) + REST** during playback to temporarily Mute the output of the sequencer as it continues to advance. Live Mute is only active as long as these buttons are held and is not stored in memory.



### LIVE RATCHET

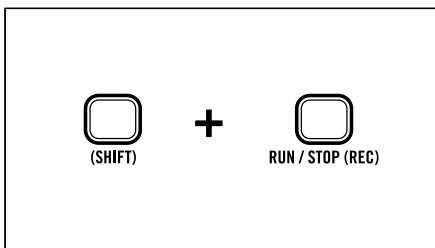
While holding **(SHIFT)**, rotate the **GLIDE** knob to add 1-4 Ratchets to each step in a pattern. Live Ratchets will override stored Ratchet data and are only active as long as **(SHIFT)** is held. Live Ratchet data is not stored in memory.

## LIVE PATTERN TRANSPOSE



Press the arrow-shaped **(KB)** or **(STEP)** buttons to select an octave and use the Keyboard to transpose a pattern during playback. The default octave setting is 4 and the default reference note is low C. Live transposition data is not stored in memory.

## KEYBOARD MODE PATTERN EDITING

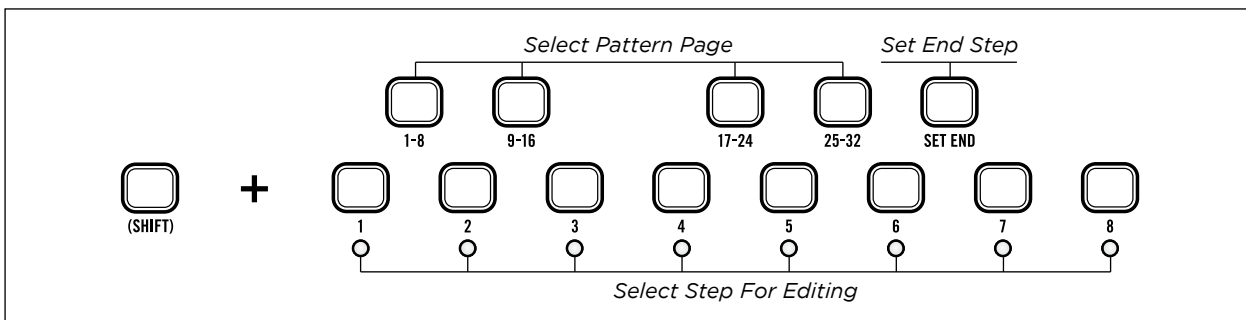


To make changes to an existing pattern using the Record function with step write behavior, press **(SHIFT) + (REC)** when the pattern is paused.

*Steps with data entered will be lit. **OCTAVE / LOCATION LED 1** will be lit green to indicate Page 1 of the pattern. Step LED 1 will blink at the current tempo, indicating that it can be edited.*

You can enter notes and step data using the “Step-Write” behavior, where notes or Rests advance through the pattern, or you can select a step in the current pattern for editing.

### EDITING A PATTERN STEP



Press **(SHIFT)** and any Step 1-8. *The corresponding Step LED blinks to indicate it is being edited. If the sequencer is stopped, the note value of the selected step is heard.* This allows steps to be edited in any order. When a step is selected in this way, any of the step parameters (Notes, Gate Length, Ties, Accents, Rests, Glide On/Off and Ratchet count) can be edited without advancing through the steps of the pattern.

To select a new step for editing, press **(SHIFT)** and the desired step button.

Press **(SHIFT)** and the currently selected step to exit editing that step.

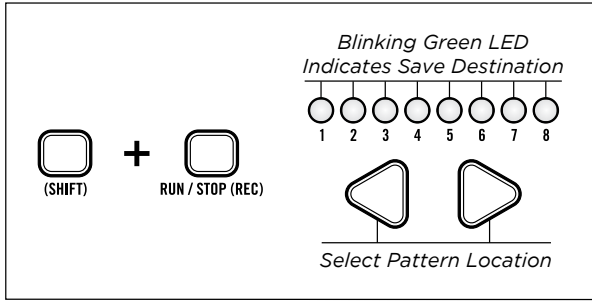
To change Pattern Pages, press **(SHIFT)** and one of the four Page Selector buttons: **1-8**, **9-16**, **17-24**, or **25-32**.

The End Step of a pattern can be changed by pressing **(SHIFT) + SET END**.

Press **(SHIFT)** and the desired Page Selector button **1-8**, **9-16**, **17-24**, or **25-32** to select the last page of the pattern.

Then press **(SHIFT)** and Step 1-8 to select the last step of the pattern. *The selected step will begin blinking at half the rate of the current tempo.*

## ■ SAVING A PATTERN



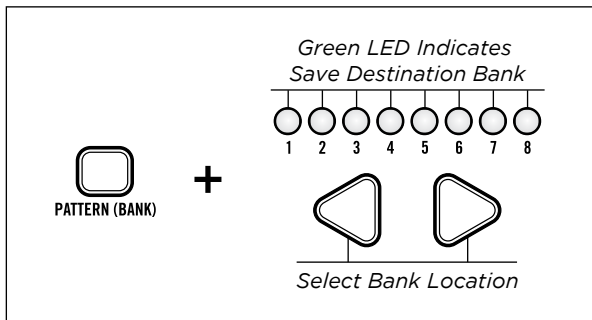
Any changes to the current pattern are discarded when changing to a new pattern unless they are saved.

To Save a pattern, hold **(SHIFT) + RUN/STOP** for one second. An **OCTAVE / LOCATION LED** will rapidly blink green indicating the current destination for saving.

To Save in the current location, simply press **(SHIFT) + RUN/STOP**.

To Save in a new location within the current bank, use the arrow-shaped **(KB)** or **(STEP)** buttons to select Pattern location 1-8.

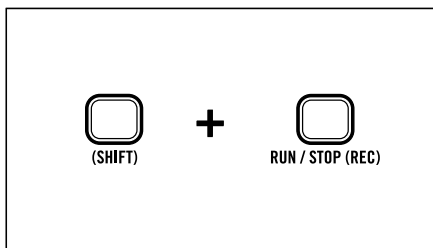
**NOTE:** You can also hold **(SHIFT)** and press one of the eight corresponding pattern location buttons.



### SELECT BANK

To Save a pattern in a different bank **(1-8)**, press and hold **(BANK)**. The current bank will be lit green. While holding **(BANK)**, use the arrow-shaped **(KB)** or **(STEP)** buttons to select a new bank. When **(BANK)** is released, the current pattern location will be indicated with a green blinking LED.

**NOTE:** You can also hold **(BANK)** and press one of the eight corresponding pattern location buttons.

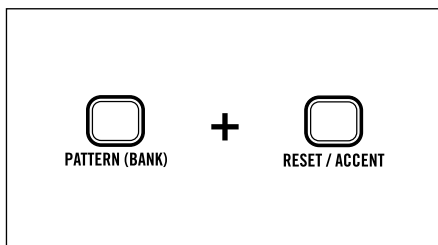


### COMPLETE OR CANCEL SAVE

To complete the saving process press **(SHIFT) + RUN/STOP**.

To exit the saving process at any time, simply press **RUN/STOP**.

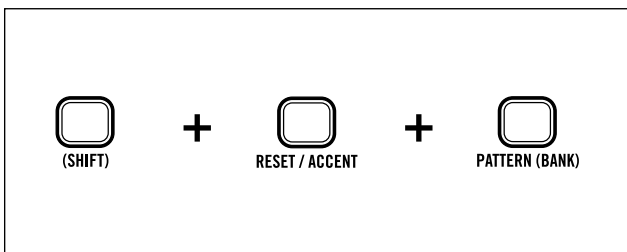
## ■ RESTORE A PATTERN FROM MEMORY



Once a pattern has been modified, it can be returned to its original state by pressing **PATTERN + RESET**. This will restore the current pattern from memory and any unsaved changes will be discarded.

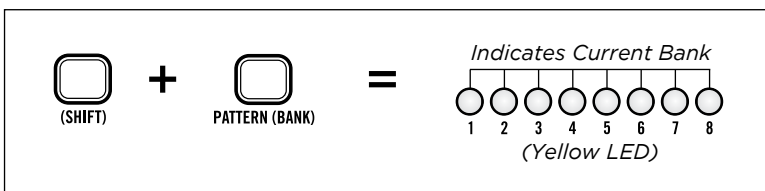


## INITIALIZING A PATTERN

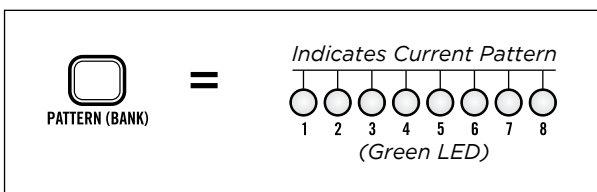


Press **(SHIFT) + RESET + PATTERN** to initialize the current pattern. This does not affect any data stored in memory, but it will discard any unsaved changes to a pattern.

## CURRENT BANK AND PATTERN LOCATION



To check the bank of a pattern currently in use, press **(SHIFT) + (BANK)**. One of eight yellow **OCTAVE / LOCATION** LEDs will be lit showing the current bank.



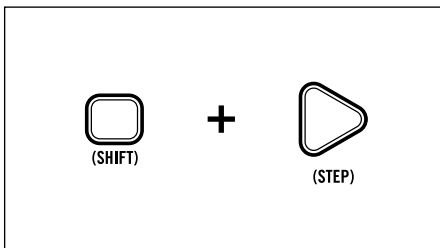
To check the location of a pattern currently in use, press **PATTERN**. One of eight green **OCTAVE / LOCATION** LEDs will be lit showing the active pattern in the current bank.

**NOTE:** There is always one active pattern when Mother-32 is in normal operation.

## TUTORIAL - CREATING A PATTERN IN STEP MODE

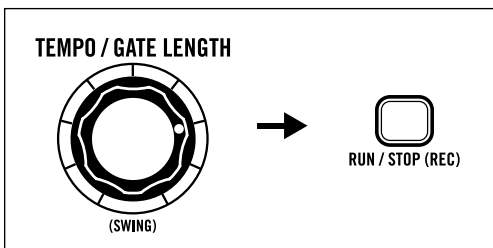
This is a tutorial that will walk you through the sequencing capabilities of your Mother-32 in Step mode. Before starting, disconnect any patch cables, set all knobs to the default position found on page 9, and ensure the current pattern is initialized by pressing **(SHIFT) + RESET + PATTERN**.

**NOTE:** In Step mode, the 13-note Keyboard and the arrow-shaped **(KB)** or **(STEP)** buttons have different functions.



### ENTER STEP MODE

Press **(SHIFT) + (STEP)**. **OCTAVE / LOCATION** LED 1 is lit yellow and there is no red **OCTAVE / LOCATION** LED indicating the current octave setting. Step LED 1 is lit solid red.

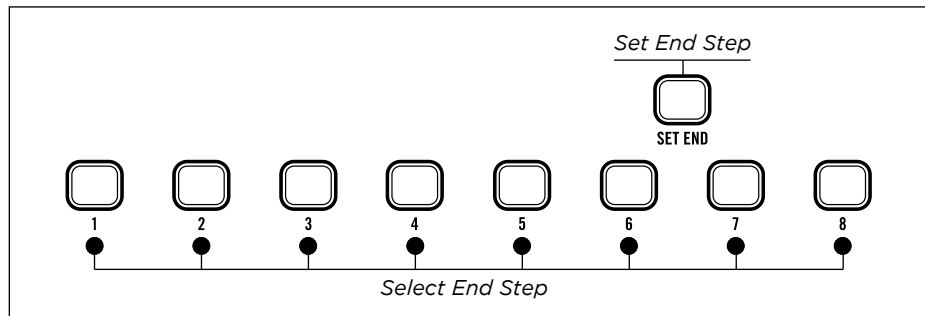


### SET THE TEMPO

Use the **TEMPO** control to set the desired tempo. Then press **RUN/STOP**. A repeating note will be heard and Step LED 1 will flash at the selected tempo.

## CREATING A PATTERN IN STEP MODE *(Continued)*

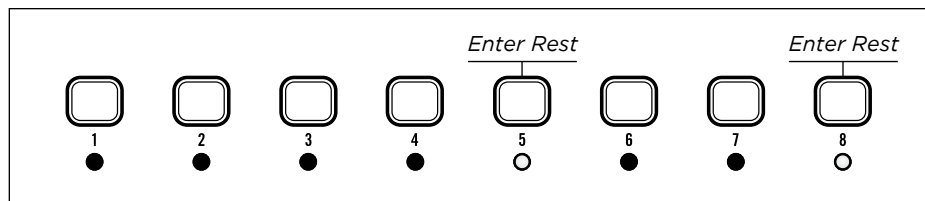
### SETTING PATTERN LENGTH



You can create a pattern with up to 32 steps, however, in this case we are going to set the pattern length to be eight steps.

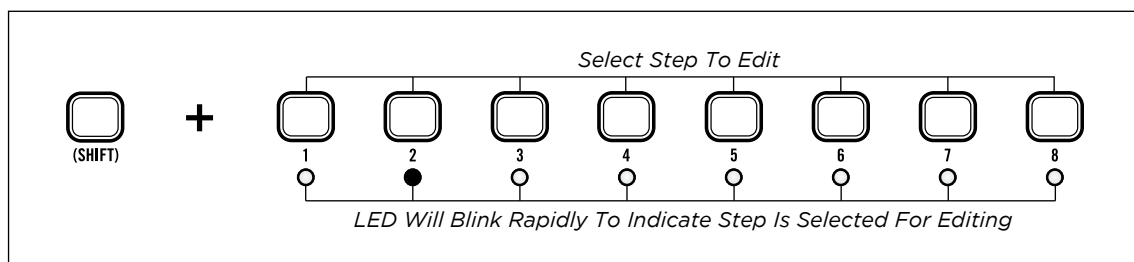
Press **SET END** and then press Step 8. *All eight Step LEDs are now lit solid and blink only when the pattern advances through them. All notes are currently the same, so you need to edit each step to make the pattern more interesting.*

### ENTERING RESTS ON STEP 5 & 8



Press the Step 5 and Step 8 buttons. *Step LEDs 5 and 8 are now turned **OFF**, and there are Rests when the sequencer advances through these steps.*

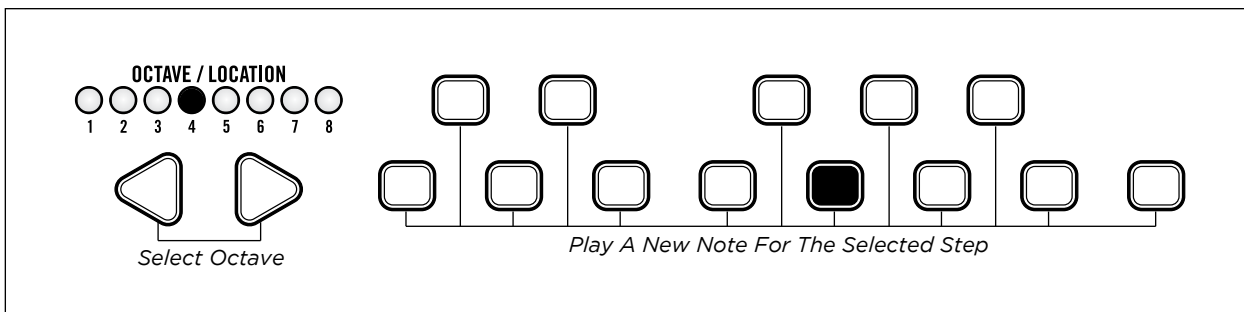
### EDITING STEP 2



Press **(SHIFT) + Step 2**. *The Tempo LED blinks alternating yellow and red at the clock rate to indicate that a step is being edited. Step LED 2 will blink rapidly indicating that it is selected for editing. A red **OCTAVE / LOCATION** LED is lit, indicating the current Keyboard octave and that the Keyboard is now ready to change the current step's note value.*

## CREATING A PATTERN IN STEP MODE *(Continued)*

### EDITING NOTES



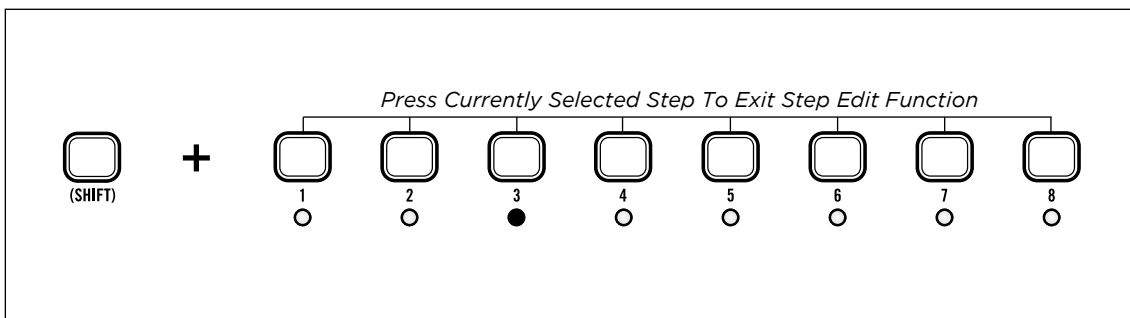
Select octave 4 with the arrow-shaped **(KB)** or **(STEP)** buttons and play the “G” key (located above Step LED 5). As the pattern continues to play back, you will hear the new note on Step 2. Now rotate the **GATE LENGTH** knob fully clockwise so that the maximum Gate Length (Tie) is selected. Now the note will be held during the transition to the next step.

### EDITING STEP 3

Press **(SHIFT) + Step 3**. Step LED 3 will blink rapidly indicating it is being edited. The changes made to Step 2 are still active in the pattern.

Rotate the **GLIDE** knob clockwise so that Glide is turned ON. **OCTAVE / LOCATION LED 5** will turn yellow indicating Glide is active on Step 3. Now you should hear a slide from the G in Step 2, to the C in Step 3.

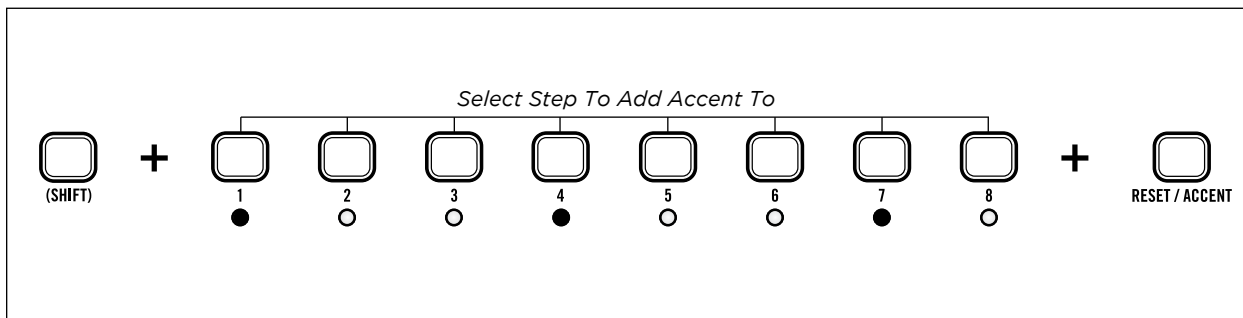
### EXIT THE STEP EDIT FUNCTION



Press **(SHIFT) + Step 3** to exit the Step Edit function. You can now adjust the **GLIDE** knob to change how fast the G slides to the C.

## CREATING A PATTERN IN STEP MODE *(Continued)*

### ADDING ACCENTS TO STEP 1, STEP 4 AND STEP 7



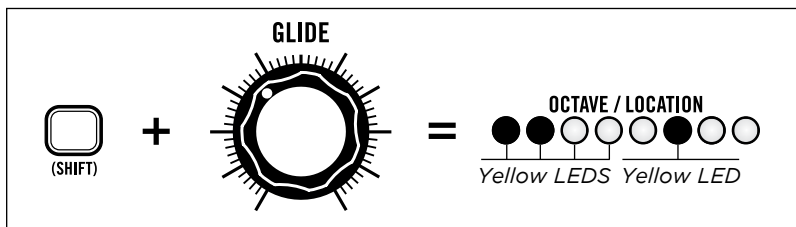
Press **(SHIFT) + Step 1**. Step LED 1 will blink to indicate it is selected for editing. Press **ACCENT. OCTAVE / LOCATION** LED 7 will be lit yellow.

Press **(SHIFT) + Step 4**. Step LED 4 will blink to indicate it is selected for editing. Press **ACCENT. OCTAVE / LOCATION** LED 7 will be lit yellow.

Press **(SHIFT) + Step 7**. Step LED 7 will blink to indicate it is selected for editing. Press **ACCENT. OCTAVE / LOCATION** LED 7 will be lit yellow.

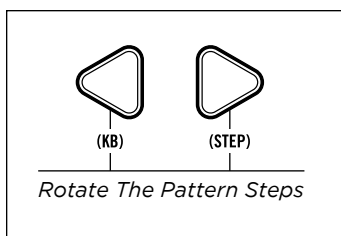
Now as the pattern plays back, you will hear an emphasis on Steps 1, 4 and 7.

### ADD A RATCHET TO STEP 6



Press **(SHIFT) + Step 6**. Step LED 6 will blink to indicate it is selected for editing. While holding **(SHIFT)**, rotate the **GLIDE** knob until **OCTAVE / LOCATION** LEDs 1 and 2 are yellow. Release **(SHIFT)**. This divides Step 6 in half and there are now two notes triggered during Step 6.

Press **(SHIFT) + Step 6** to exit the Step Edit function.

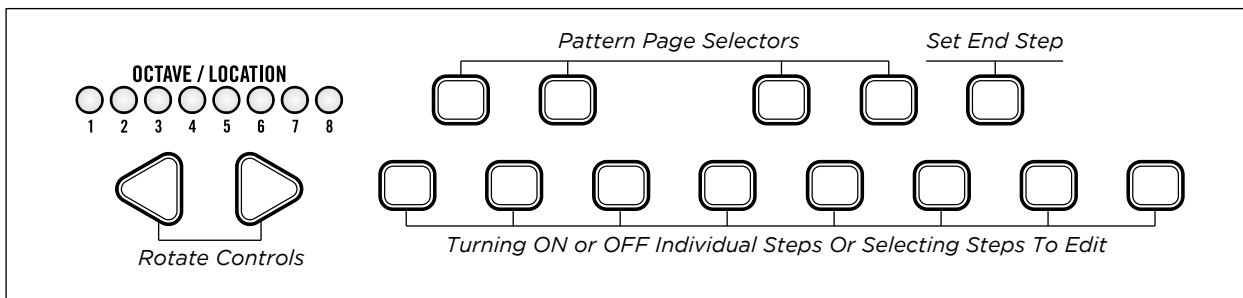


### SHIFTING THE DOWNBEAT OF A PATTERN

Press the **(KB)** button three times and notice the Rests have moved. The arrow-shaped **(KB)** and **(STEP)** buttons “rotate” the pattern steps, allowing modification of the rhythmic feel and downbeat of a pattern. This can be useful if you create a pattern and it feels like the “1” of the beat is on a different step than Step 1. To change it back you can simply press the **(STEP)** button three times.

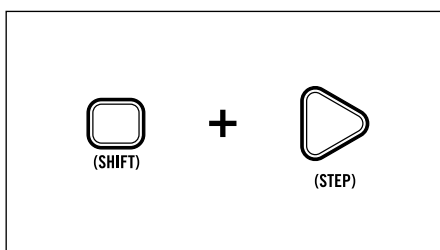
*If you like this pattern, save it. The Save procedure is the same for both Keyboard mode and Step mode.*

## PLAYING AND EDITING A PATTERN IN STEP MODE



The Mother-32 Step mode repurposes the 13-note Keyboard and the arrow-shaped **(KB)** and **(STEP)** buttons to be performance controls for modifying patterns during playback. The eight buttons directly above the Step LEDs are the Step buttons. They are used for turning On or Off individual steps or for selecting steps for editing. The 4 buttons labeled **1-8**, **9-16**, **17-24**, and **25-32** are the pattern page selectors, while the 5th button labeled **SET END** is used to specify the last step of a pattern.

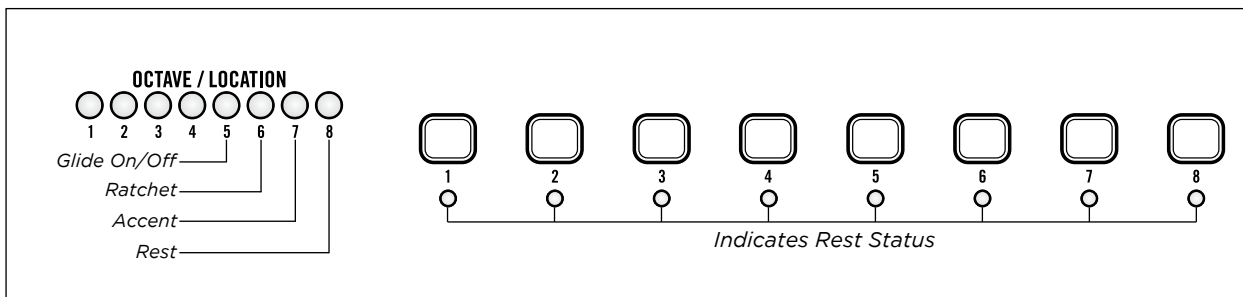
The **(KB)** and **(STEP)** buttons become “Rotate” controls, nudging all of the steps of a pattern forward or backward by one location to modify the downbeat of a pattern.



### ENTER STEP MODE

To enter Step mode from KB mode, press **(SHIFT) + (STEP)**.

The red Octave LED will disappear, and the **OCTAVE / LOCATION** indicators for the pattern page (Glide, Ratchet, Accent, and Rest) will be yellow on the steps where those functions are active. The eight Step LEDs will indicate the rest status of all eight steps in the current pattern page.



The performance functions in Step mode (Run/Stop, Tempo, Reset and Hold) and the Shift functions during playback (Accents, Rests, and Ratchets) are all the same as in KB mode.

There is no Record function in Step mode. To modify a step in Step mode, with the sequencer running or not, press **(SHIFT)** and the desired Step button in the current pattern page. *The Step LEDs will stop advancing with the pattern and the selected Step LED will blink to indicate that it is being edited. At this point, the red **OCTAVE / LOCATION** LED will appear, indicating that the keyboard can be used to modify the note value of the current step being edited.*

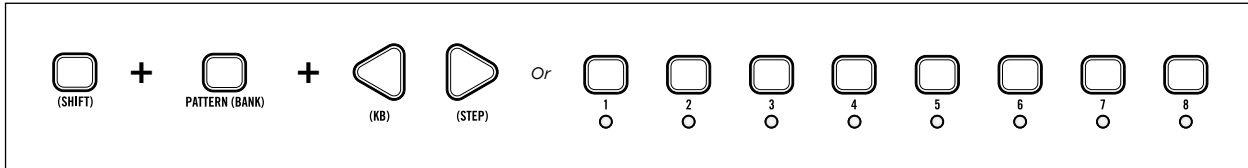
At this time all values in the step (Note, Gate Length, Accent, Rest, Glide On/Off and Ratchet value) can be modified.

Once the desired changes to the current step are made, a new step can be selected for editing or the Step Edit function can be exited by pressing **(SHIFT)** and the currently selected Step button.

# SEQUENCER PANEL FUNCTION QUICK REFERENCE

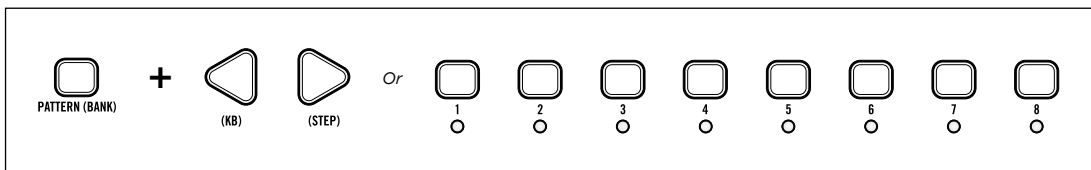
## ■ SEQUENCER MEMORY AND LOADING A PATTERN

### SELECT BANK



While holding **(SHIFT) + PATTERN**, use Step buttons 1-8, or the **(KB)** and **(STEP)** buttons to select a new bank.

**TIP:** When selecting a Bank Number, the Bank Number LED will be shown in yellow, to distinguish it from the Pattern Number LED which is shown in green.



### SELECT PATTERN

While holding **PATTERN**, use the **(KB)** and **(STEP)** buttons, or Step buttons 1-8 to select a new pattern. When changing patterns during performance, you can specify how (and when) the pattern will change.

### DELAY PATTERN CHANGE

Normally, when a new pattern is selected as the sequencer is playing, the current pattern will finish playing before the new pattern will begin (Delay Pattern Change On). However it is possible to have the newly selected pattern begin instantly, without waiting for the previous pattern to finish (Delay Pattern Change Off). This Delay Pattern Change parameter can be accessed can be found on Setup menu Page 8, option 6.

### LOAD SAVED TIMING

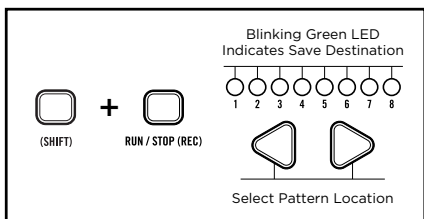
By default, when a pattern is loaded from memory, it also restores the Clock Division, Swing Amount, and Swing Interval that were active when the sequence was saved (Load Saved Timing On). If Load Saved Timing is Off, then changing patterns will not change the timing settings which are currently active. Load Saved Timing can be adjusted on Setup Menu page 8, option 7.

**NOTE:** Unsaved changes to a pattern will be lost when a pattern location is changed, initialized, or restored during normal operation.

## SEQUENCER PANEL FUNCTION QUICK REFERENCE *(Continued)*

### SAVING A PATTERN

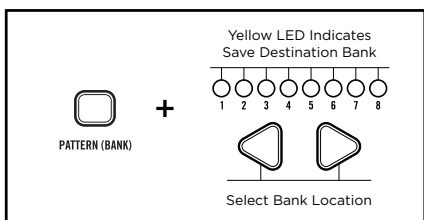
In addition to the Manual Save mode, there are two alternative Save modes available – Auto Save and Write Protect. Selecting the Save mode can be done on Page 6 of the Mother-32 Setup mode.



### MANUAL SAVE MODE

In this mode, you must manually save any changes. If you change patterns before saving your changes, the changes will be lost. To manually save the pattern press the **(SHIFT)** + **RUN / STOP** buttons simultaneously for about a second. One of the **OCTAVE / LOCATION** LEDs (1-8) will begin to blink rapidly, indicating the location where the pattern will be saved. To save the pattern to this location, simply press the **(SHIFT)** + **RUN / STOP** buttons again. Otherwise, use the **(KB)** button or the **(STEP)** button to select a different pattern location. Again, the blinking LED will indicate the specified location. Press the **(SHIFT)** + **RUN / STOP** buttons to save your pattern to this location, or simply press the **RUN / STOP** button to exit without saving.

***NOTE:** You can also hold **(SHIFT)** and press one of the eight corresponding pattern location buttons.*



To manually save the pattern to a location in a different bank (1-8), first press and hold the **(BANK)** button while using the **(KB)** button or the **(STEP)** button to select a different bank. Release the **(BANK)** button and you can now use the **(KB)** button or the **(STEP)** button to select a pattern location within that bank. Press the **(SHIFT)** + **RUN / STOP** buttons to save your pattern to this location, or simply press the **RUN / STOP** button to exit without saving.

***NOTE:** You can also hold **(BANK)** and press one of the eight corresponding bank location buttons.*

### CANCEL / SAVE

To complete the saving process press **(SHIFT)** + **RUN / STOP**.  
To exit the saving process at any time, simply press **RUN / STOP**.

***NOTE:** When saving the current pattern, the **OCTAVE / LOCATION** LEDs will sweep to the center, in green, to verify that the pattern has been saved.*

***NOTE:** When canceling the save operation, the **OCTAVE / LOCATION** LEDs will sweep to the center, in red, to signify that the save operation was canceled, and that the pattern was not saved.*

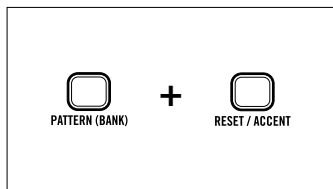
### AUTO SAVE MODE

In this mode, changes you make to the current pattern will automatically be saved. The original pattern remains unchanged and resides in a buffer. To restore the pattern to its original state (as first loaded before any editing began), hold the **PATTERN** button and press the **RESET** button. Otherwise, selecting a new pattern will cause the changes you have made to become permanent.

### WRITE PROTECT MODE

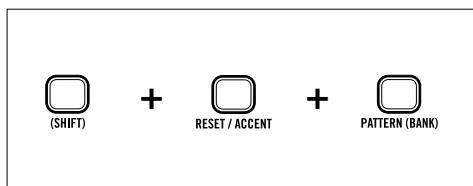
In this mode, changes you make to the current pattern cannot be saved. The patterns can be tweaked and modified as part of a performance or sonic exploration, but the contents of the Mother-32 pattern memory will remain unaffected.

## SEQUENCER PANEL FUNCTION QUICK REFERENCE *(Continued)*



### RESTORE A SAVED PATTERN

Press **PATTERN + RESET**.

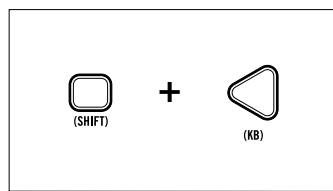


### INITIALIZE CURRENT PATTERN

Press **(SHIFT) + RESET + PATTERN**.

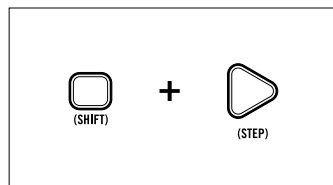
**NOTE:** When initializing the current pattern, the **OCTAVE / LOCATION LEDs** will sweep from right to left, in red, to indicate that the pattern has been initialized.

## ■ MODE SELECTION



### KB (KEYBOARD)

Press **(SHIFT) + (KB)**.



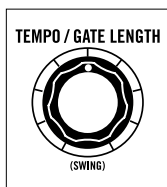
### STEP

Press **(SHIFT) + (STEP)**.



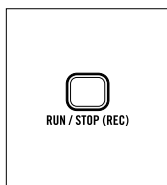
# SEQUENCER PANEL FUNCTION QUICK REFERENCE *(Continued)*

## ■ SEQUENCER CONTROLS



### SET INTERNAL CLOCK TEMPO

Rotate the **TEMPO** knob.

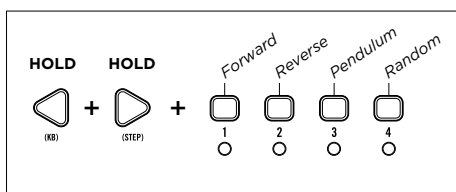


### START/PAUSE PATTERN PLAYBACK

Press **RUN/STOP**.

## SEQUENCER PLAYBACK DIRECTION

The playback order of the notes being generated by the sequencer can be changed from Forward (normal/default), to Reverse (backward), to Pendulum (back & forth), or to Random.



To set the playback order, hold down both the arrow-shaped **(KB)** and **(STEP)** buttons while pressing one of the first four **(STEP)** buttons.

### FORWARD / **(KB)** + **(STEP)** + 1

This combination of buttons will cause the notes stored in the sequencer to play normally, from beginning to end. This is the default setting.

### REVERSE / **(KB)** + **(STEP)** + 2

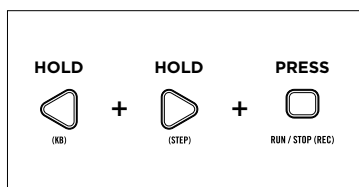
This combination of buttons will cause the notes stored in the sequencer to play in reverse order, from end to beginning.

### PENDULUM / **(KB)** + **(STEP)** + 3

This combination of buttons will cause the notes stored in the sequencer to play in pendulum order, alternating from beginning to end, from end to beginning, from beginning to end, etc.

### RANDOM / **(KB)** + **(STEP)** + 4

This combination of buttons will cause the notes stored in the sequencer to play in a random order.

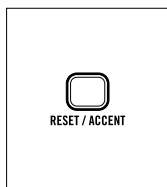


## PRE-ARMING THE SEQUENCER FOR AN EXTERNAL CLOCK

If the Tempo Input mode is set to Single Clock Advance or to Analog Clock (page 55), then holding down the **(KB)** and **(STEP)** buttons then pressing the **RUN / STOP** button will arm the sequencer for use with an external clock. In this case, the sequencer is stopped, but it will begin playing as soon as the next clock or trigger is detected at the **TEMPO** input jack.

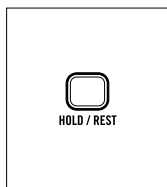
**NOTE:** To start the sequencer playing from the beginning, press **RESET** after arming the sequencer and before starting the external clock.

# SEQUENCER PANEL FUNCTION QUICK REFERENCE *(Continued)*



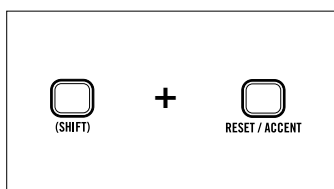
## RETURN TO STEP 1

Press **RESET**.



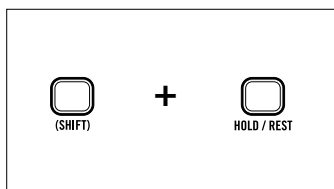
## REPEAT CURRENT STEP DURING PLAYBACK

Press **HOLD** while the sequencer is running. Normal playback resumes on release.



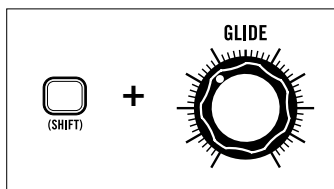
## MOMENTARY ACCENT DURING PLAYBACK

Hold **(SHIFT) + ACCENT**. Normal playback resumes on release.



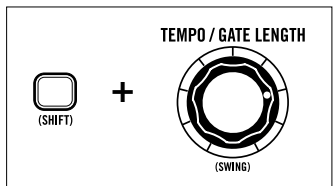
## MOMENTARY MUTE DURING PLAYBACK

Hold **(SHIFT) + REST**. Normal playback resumes on release.



## MOMENTARY RATCHETS DURING PLAYBACK

Hold **(SHIFT)** and rotate the **GLIDE** Control. Normal playback resumes on release.



## MODIFY SWING AMOUNT

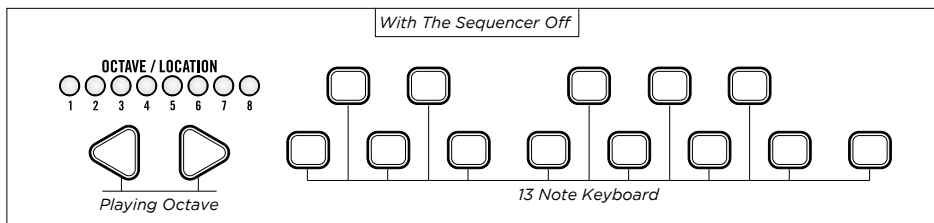
Press **(SHIFT)** and rotate the **TEMPO** Control.

**NOTE:** The Swing Interval is set independent of the Swing Amount. Please refer to the Swing section on page 19 of this manual for details.

# SEQUENCER PANEL FUNCTION QUICK REFERENCE *(Continued)*

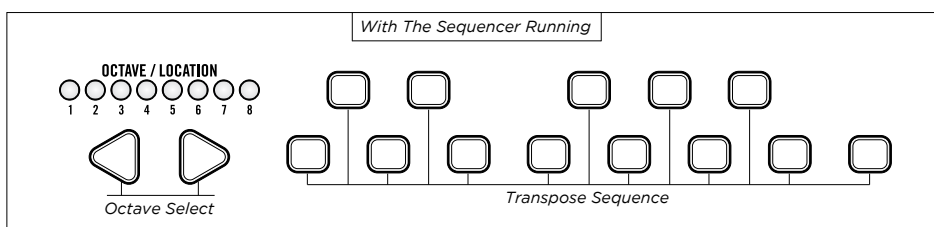
## KEYBOARD MODE PANEL FUNCTIONS

### LIVE PLAY



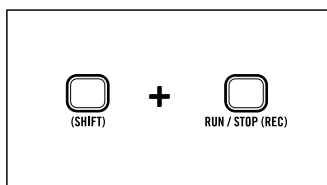
With the Sequencer Off, the **(KB)** and **(STEP)** buttons determine the playing octave, and the sequencer controls become a 13-note Keyboard.

### TRANPOSE A SEQUENCE



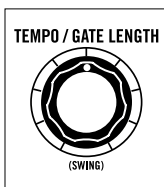
With the Sequencer running, select an octave with the **(KB)** and **(STEP)** buttons, and notes with the 13-note keyboard.

**NOTE:** The transposition will not take effect until a note is pressed.



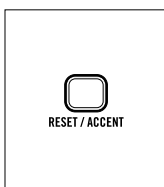
### KB RECORD MODE

Press **(SHIFT) + (REC)**. The Record function is now ready for Step-Write pattern entry. The first note or Rest advances to Step 1, the second to Step 2 and so on. To exit, press **RUN/STOP** or you can enter Step mode.



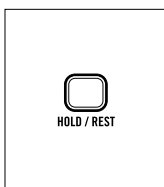
### GATE LENGTH | STEP MODE

Rotate the **GATE LENGTH** knob to modify the Gate Length of a currently selected step. Maximum Gate Length ties the selected step to the next step.



### ACCENT | KB MODE

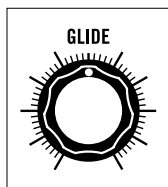
Press **ACCENT** to add an Accent to the current step.  
**OCTAVE / LOCATION LED 7 is green when Accent is On.**



### REST | KB MODE

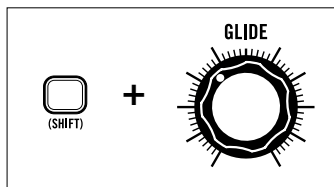
Press **REST** to add a Rest to the current step and advance to edit the next step.  
**OCTAVE / LOCATION LED 8 is green when Rest is On.**

# SEQUENCER PANEL FUNCTION QUICK REFERENCE *(Continued)*



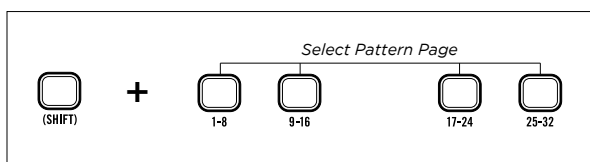
## GLIDE ON/OFF | KB MODE

Rotate the **GLIDE** knob clockwise to turn Glide **ON** for a step. Rotate the **GLIDE** knob fully counterclockwise to turn Glide **OFF** for that step. **OCTAVE / LOCATION LED 5 is green when Glide is On.**



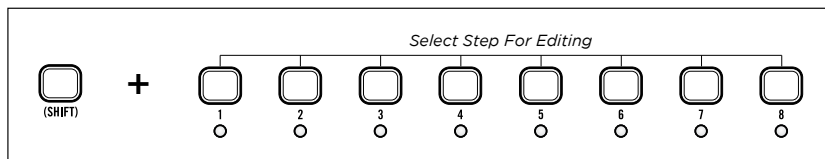
## RATCHET | KB MODE

While holding **(SHIFT)**, rotate the **GLIDE** knob to select a value of 1-4. *The Ratchet value is shown in yellow on the **OCTAVE / LOCATION LEDs 1-4**, indicating the number of notes per step. **OCTAVE / LOCATION LED 6 is green when a Ratchet value is set from 2 to 4.***



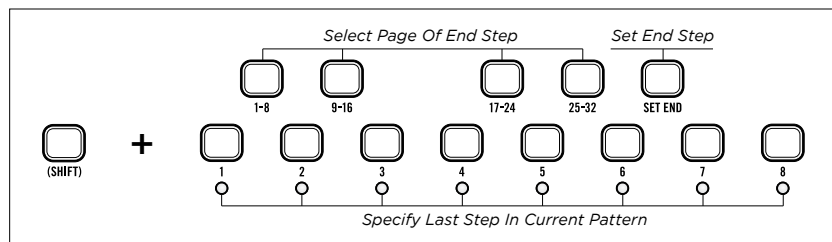
## PATTERN PAGE SELECT | KB MODE

Press **(SHIFT) + Page** button **1-8, 9-16, 17-24** or **25-32**. If the sequencer is running, this will pause the page chasing behavior. Press **(SHIFT) +** the currently selected Page button to resume page chasing.



## STEP SELECT AND EDIT | KB MODE

Press **(SHIFT) + Step** button 1-8. If in the Record function, this stops the Step-Write behavior so that any step can be selected for editing. When a step is selected and the sequencer is stopped, the current note value is played so its pitch can be monitored prior to editing.



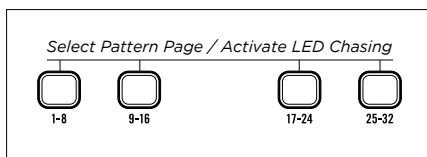
## SET END STEP | KB MODE

Press **(SHIFT) + SET END**. If the desired end step is on a different page, press **(SHIFT) + Page** button **1-8, 9-16, 17-24** or **25-32**. To specify the last step in the current pattern, press **(SHIFT) + Step** button 1-8.

If the new end step is after the previous end step, the notes are filled as follows: If the steps after the previous end step have never been edited and stored in memory, or if the pattern was initialized, then all steps get the default note value (-1V) and gate length (50%). If the steps were previously edited, then they are restored.

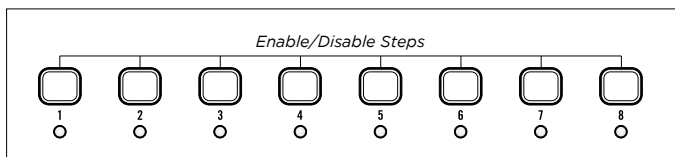
# SEQUENCER PANEL FUNCTION QUICK REFERENCE *(Continued)*

## ■ STEP MODE PANEL FUNCTIONS



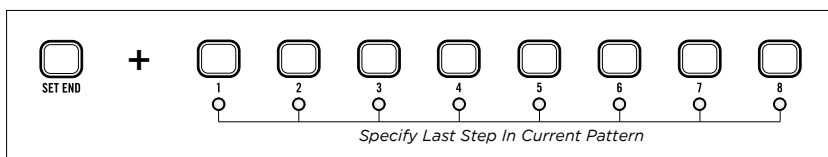
### PATTERN PAGE SELECT | STEP MODE

Press Pattern Page button **1-8**, **9-16**, **17-24**, or **25-32**. If the sequencer is running, selecting a page pauses the chasing behavior of **OCTAVE / LOCATION** LEDs 1-4, and the Step buttons address only steps on the selected page. To resume the LED chasing behavior, press the currently selected Page button again.



### ENABLE/DISABLE STEPS | STEP MODE

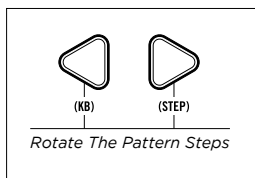
Press any Step button 1-8 to toggle steps On/Off. The state of each step is indicated by Step LEDs 1-8. *If a step is Off, **OCTAVE / LOCATION** LED 8 will be lit yellow to indicate the step contains a Rest.*



### SET END | STEP MODE

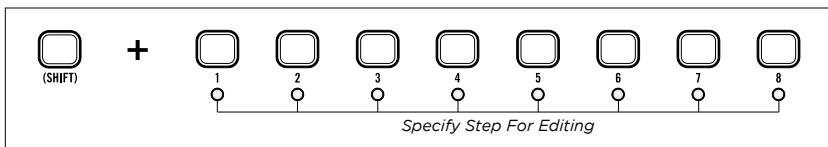
Press **SET END** followed by a Step button corresponding to the desired last step.

If the new end step is after the previous end step, the notes are filled as follows: If the steps after the previous end step have never been edited and stored in memory, or if the pattern was initialized, then all steps get the default note value (-1V) and gate length (50%). If the steps were previously edited then they are restored.



### ROTATE SEQUENCE | STEP MODE

Press the right-arrow shaped **(STEP)** button to move all steps right by one step. Press the left-arrow shaped **(KB)** button to move all the steps left by one step.

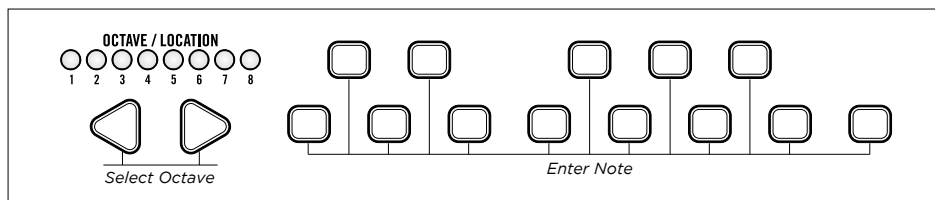


### STEP EDIT | STEP MODE

Press **(SHIFT) + Step** button 1-8 to select it for editing whether the sequencer is running or stopped. *The currently selected Step LED*

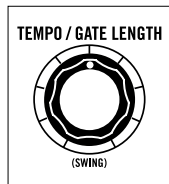
*will blink and all other Step LEDs are turned off to indicate the step being edited. The Tempo LED also blinks yellow alternating with the clock to indicate a step is being edited. A red **OCTAVE / LOCATION** LED indicates the current keyboard octave. While a step is being edited the keyboard buttons function to select the note for that step. Press **(SHIFT)** and the selected Step button to exit Step Edit.*

# SEQUENCER PANEL FUNCTION QUICK REFERENCE *(Continued)*



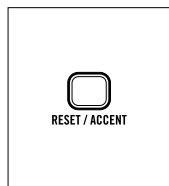
## NOTE VALUE | STEP MODE

Use the **(KB)** and **(STEP)** buttons, to select an octave, and press one of the 13 keyboard buttons to enter the note for a selected step.



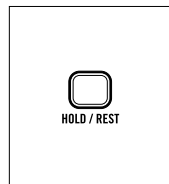
## GATE LENGTH | STEP MODE

Rotate the **GATE LENGTH** knob to modify the Gate Length of a currently selected step. Maximum Gate Length ties the selected step to the next step.



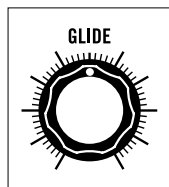
## ACCENT | STEP MODE

Press **ACCENT** to add an Accent to the current step. **OCTAVE / LOCATION** LED 7 is green when On.



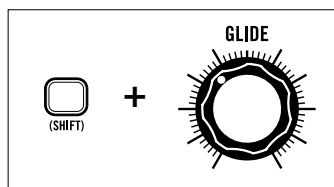
## REST | STEP MODE

Press **REST** to toggle Rest On/Off for a currently selected step.



## GLIDE ON/OFF | STEP MODE

Rotate the **GLIDE** knob right to turn Glide **ON** for a currently selected step. Rotate the **GLIDE** knob fully counterclockwise to turn Glide **OFF** for that step. **OCTAVE / LOCATION** LED 5 is green when glide is On.



## RATCHET | STEP MODE

Hold **(SHIFT)** while turning the **GLIDE** knob. **OCTAVE / LOCATION** LEDs 1-4 will temporarily light up as long as the **GLIDE** knob is being moved, indicating the number of ratchets (repeats) in the current step. **OCTAVE / LOCATION** LED 6 is lit when the ratchet value is set from 2 to 4.

# CONTROL VOLTAGE OVERVIEW

Control voltages are signals used to modify circuits in an analog synthesizer. They can affect the pitch of a VCO, the timbre produced at the output of a VCF, or the loudness at the output of a VCA.

A simple example is the **VCO FREQUENCY** knob. It generates a voltage based on its rotation that is connected to the control input of the VCO. When you turn it counterclockwise, the voltage and VCO pitch are reduced. When you turn it clockwise, the voltage and VCO pitch are increased. In a fixed position, the voltage and VCO pitch remain steady.

Another example is using an LFO to modulate the pitch of a VCO. The LFO produces a control voltage that is applied to the VCO control input. This causes the VCO pitch to go up and down at the rate of the LFO.

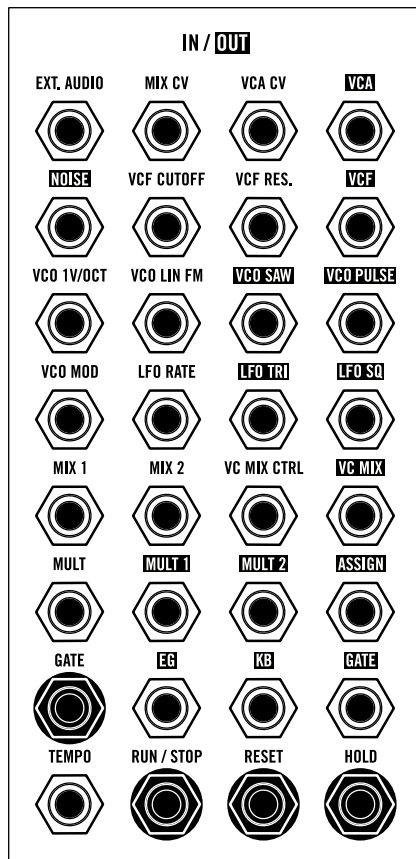
In terms of analog synthesizers, audio signals are used to generate sound, typically in the audible range of 20Hz to 20kHz. Control signals are used to modify the audio signals.

**NOTE:** In analog synthesizers, audio signals can also be used as control signals. Timing signals are signals that change rapidly in time, such as a gate signal. Frequently they have only two levels that represent On and Off.

A Gate signal in Mother-32 for instance, is off at 0 Volts and on at +5 Volts. A Gate signal can be used to trigger events, such as starting an Envelope Generator, or starting the sequencer running.

In a fully modular synthesizer, all connections must be made with patch cables. Mother-32 is a semi-modular synthesizer. This means that some connections have been made internally so that patch cables are not required to produce sound at the output or to perform basic useful modulation. For each synthesizer function there are control inputs and outputs that appear on the patchbay.

## MOTHER-32 PATCHBAY



The Mother-32 Patchbay contains 32 x 3.5mm patch points, which allow for extended synthesis capabilities and modular interconnectivity.

The Mother-32 Patchbay is designed to work with 3.5mm patch cables only. A pack of 5 is included with your Mother-32. If you should need more, 6" and 12" packs of Moog cables are available for purchase at authorized dealers.

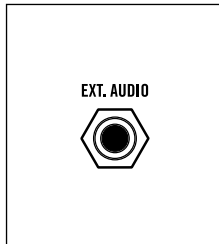
Patch points whose labels are written in standard text are inputs, while patch points whose labels are reversed are outputs.

Patch points with circles around them are Gate inputs.

**NOTE:** When patching, it is OK to split an output signal with a "Mult", a "y" cable, or with cables with stackable plugs. When connecting to inputs, only connect one output signal to a single input to prevent over-voltages.

# PATCHBAY INPUTS AND OUTPUTS

## EXTERNAL AUDIO INPUT

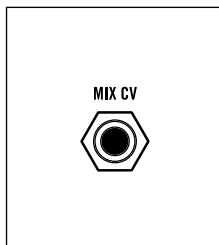


### EXTERNAL AUDIO INPUT

This is a unity gain input that allows other sound sources to be processed by Mother-32's onboard Filter. Because this is a unity gain input designed to Eurorack level standards, an external audio source applied to this input should be 10V peak to peak. Signals lower than this (an MP3 player for instance) will need to be amplified prior to being input to the **EXT. AUDIO** jack for proper volume performance levels.

**NOTE:** When a cable is plugged into this jack, it overrides the normalization of noise to the clockwise position of Mother-32's main mixer. This means that the **MIX** control becomes a level balancing control for the onboard oscillator and any sound source plugged into the **EXT. AUDIO** jack.

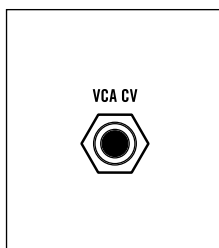
## MIX CONTROL VOLTAGE INPUT



### MIX CV INPUT

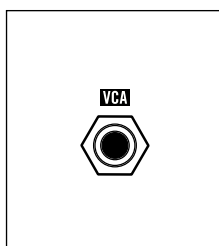
This input is summed with the **MIX** panel control. With the **MIX** knob at center position, a -5V to +5V CV applied to this input will crossfade between the selected VCO waveform and the **EXT. AUDIO** input (normalised to White Noise).

## VOLTAGE CONTROLLED AMPLIFIER



### VCA CV INPUT

This input allows a control voltage to be applied to Mother-32's output VCA. Patching an LFO to this input will allow you to create Tremolo effects (0 to +8V in EG mode and +/-5V in ON mode, summed with signals from ON/EG switch).



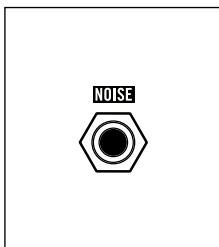
### VCA OUTPUT

This is the output from the VCA after the Volume attenuator (+/-5V, typical).



## PATCHBAY INPUTS AND OUTPUTS *(Continued)*

### ■ NOISE

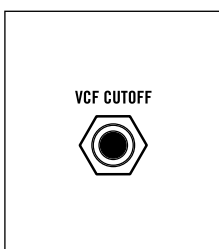


#### NOISE OUTPUT

This is the output for the Mother-32's White Noise generator. Noise is useful for creating percussion and wind sounds, as well as for random noise modulations (+/-5V, typical).

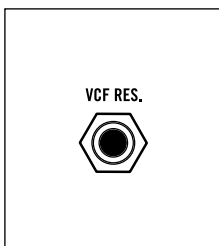
**NOTE:** Noise is also normalled to the clockwise position of the main MIX control.

### ■ VOLTAGE CONTROLLED FILTER



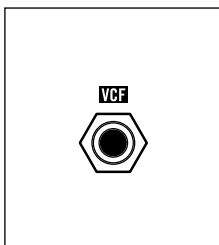
#### VCF CUTOFF INPUT

This input is summed with the Filter **CUTOFF** knob and the VCF Modulation signal. If the **CUTOFF** knob is at center position, and the **VCF MOD AMOUNT** control is fully Off, a -5V to +5V control voltage at this input will sweep the Filter from 20Hz to 20kHz.



#### VCF RES INPUT

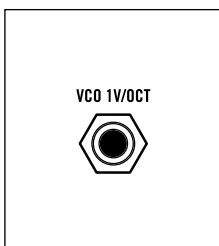
This input is summed with the **RESONANCE** knob. If the **RESONANCE** knob is at center position, a -5V to +5V control voltage at this input will sweep the Resonance from minimum to maximum.



#### VCF OUTPUT

This the output of the Moog Ladder Filter. Its level depends greatly on the signals at the Filter input and the Filter Cutoff frequency (Maximum output is approximately +/-5V).

### ■ VOLTAGE CONTROLLED OSCILLATOR



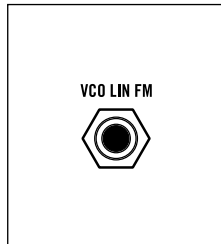
#### VCO 1V/OCT INPUT

This is a 1V/Octave Exponential frequency modulation input that is summed internally with the **VCO FREQUENCY** knob, the Keyboard CV and any VCO frequency modulation. With all internal control signals at 0V, a -5 to +5V control voltage at this input will sweep the VCO frequency from 8Hz to 8kHz (10 Octaves).

**NOTE:** When using an external CV controller, use this input for proper 1V/Octave tracking. If the tracking is off, see VCO Calibration on page 61.

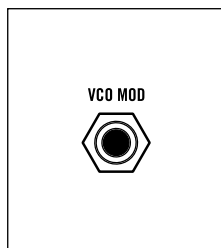
## PATCHBAY INPUTS AND OUTPUTS *(Continued)*

### VOLTAGE CONTROLLED OSCILLATOR *(continued)*



#### VCO LIN FM INPUT

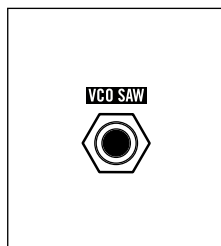
This is a Linear Frequency Modulation input, which is useful for modulating the VCO with audio rate waveforms to achieve very harmonically rich sounds. (Accepts a -5 to +5V signal).



#### VCO MOD INPUT

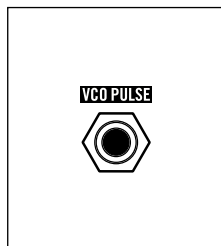
This input is routed to the **UP** position of the **VCO MOD SOURCE** selector switch (**EG/VCO MOD**).

**NOTE:** When a cable is plugged into the **VCO MOD** input, it overrides the normalization of the **EG** to the **UP** position of the **VCO MOD SOURCE** switch. This allows the **VCO MOD AMOUNT** knob to function as an attenuator for anything plugged into the **VCO MOD** input prior to being sent to a selected VCO Mod Destination.



#### VCO SAW OUTPUT

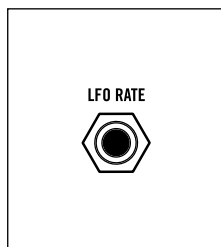
This output is the VCO Sawtooth waveform (+/-5V).



#### VCO PULSE OUTPUT

This output is the VCO Pulse waveform (+/-5V).

## ■ LOW FREQUENCY OSCILLATOR

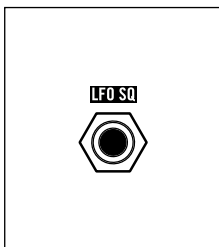


#### LFO RATE INPUT

This input is summed with the **LFO RATE** panel knob. With the **RATE** knob at center position, a -5V to +5V control voltage at this input will sweep the LFO Rate from roughly .18Hz to 190Hz. Maximum LFO rate is about 600Hz.

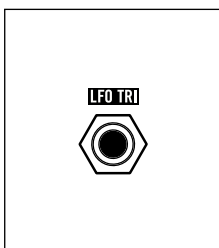
## PATCHBAY INPUTS AND OUTPUTS *(Continued)*

### VOLTAGE CONTROLLED OSCILLATOR *(Continued)*



#### LFO SQ OUTPUT

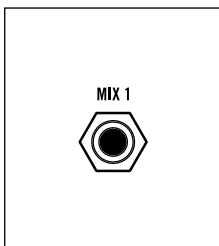
This output is the LFO Square waveform (+/-5V).



#### LFO TRI OUTPUT

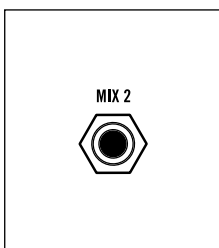
This output is the LFO Triangle waveform (+/-5V).

## ■ VC MIX - VOLTAGE CONTROLLED, DC COUPLED MIXER



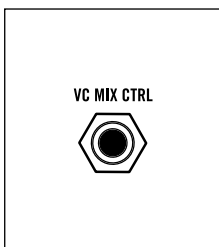
#### MIX 1 INPUT

This input is normalized to 0V and routed to the counterclockwise position of the **VC MIX** knob. This is a DC coupled input and accepts a -5 to +5V CV.



#### MIX 2 INPUT

This input is normalized to a nominal +5V signal and routed to the clockwise position the **VC MIX** knob. This is a DC coupled input and accepts a -5 to +5V CV.

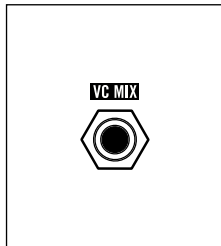


#### VC MIX CTRL INPUT

This input is summed with the **VC MIX** knob position. With the **VC MIX** knob at center position, a -5V to +5V control voltage at this input crossfades between the **MIX 1** and **MIX 2** inputs.

## PATCHBAY INPUTS AND OUTPUTS *(Continued)*

### VC MIX *(Continued)*



#### VC MIX OUTPUT

This is the output of the VC Mixer which is a blend of the **MIX 1** and **MIX 2** input signals set by the **VC MIX** panel knob and **VC MIX CTRL** CV input. (+/-5V).

#### VC MIX ALTERNATE USES: FIXED VOLTAGE SOURCE

With nothing plugged into the **MIX 1** or **MIX 2** inputs, the **VC MIX** knob allows the **VC MIX** output to transmit a variable fixed voltage from 0 to +5V.

#### ATTENUATOR

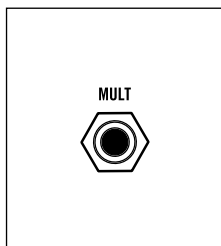
Apply a CV signal to be attenuated to the **MIX 2** input. With the **VC MIX** knob at full counterclockwise position, the signal is fully attenuated. Turn the **VC MIX** knob clockwise to increase the amount of **MIX 2** input signal passed to the **VC MIX** output.

#### VCA

Apply a CV signal to the **MIX 2** input. With the **VC MIX** knob at a fully counterclockwise position, apply a 0V to positive CV signal to the **VC MIX CTRL** input (EG for example). This will dynamically determine the amplitude of the signal at the **MIX 2** input that is passed to the **VC MIX** output.

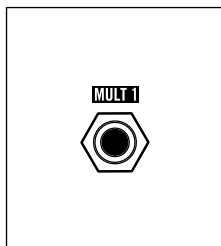
## ■ MULTIPLE

The **MULT** section of the patchbay is a signal splitter that allows you to take a single voltage source and send it to two independent locations.



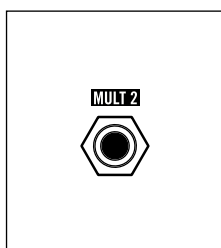
#### MULT INPUT

Buffered signal input.



#### MULT 1 OUTPUT

Buffered Output 1 of the **MULT** input.



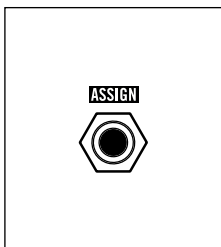
#### MULT 2 OUTPUT

Buffered Output 2 of the **MULT** input.

**WARNING:** Do not use the Mult to mix two signals together. It is designed to be used *ONLY* as a CV signal splitter.

## PATCHBAY INPUTS AND OUTPUTS *(Continued)*

### ■ ASSIGNABLE OUTPUT



#### **ASSIGN OUTPUT**

This is the output for the assignable jack. Its source is programmed in Setup mode. To learn more about Setup mode, go to page 58.

#### **THE FOLLOWING OUTPUT SOURCES ARE AVAILABLE:**

##### **1: ACCENT**

This outputs a 0 to +5V filtered pulse signal from Accented pattern steps only.

##### **2: CLOCK (Default)**

This outputs a 0 to +5V Clock signal at the internal clock tempo, one pulse per step.

##### **3: CLOCK/2**

This outputs a 0 to +5V Clock signal at half the clock rate of the internal clock tempo.

##### **4: CLOCK/4**

This outputs a 0 to +5V Clock signal at one quarter of the clock rate of the internal clock tempo.

##### **5: STEP RAMP**

This outputs a -5 to +5V Ramp wave that increases in value equally across the number of steps in the current pattern. The wave is reset at minimum when the sequencer cycles to step 1.

##### **6: STEP SAW**

This outputs a -5 to +5V Saw wave that decreases in value equally across the number of steps in the current pattern. The wave is reset at maximum when the sequencer cycles to step 1.

##### **7: STEP TRIANGLE**

This outputs a -5 to +5V Triangle wave that alternates every pattern run between an increase in value equally across the number of steps in the current pattern, and a decrease in value equally across the number of steps in the current pattern.

##### **8: STEP RANDOM**

This outputs a random voltage between -5V and +5V per step while the sequencer is running.

##### **9: STEP 1 TRIGGER**

This outputs a 0 to +5V pulse output only on step 1 of the current pattern.

##### **10: MIDI VELOCITY**

This outputs a -5V to +5V signal from MIDI Note On Velocity values 0 to 127.

##### **11: MIDI CHANNEL PRESSURE**

This outputs a -5V to +5V signal from MIDI Channel Aftertouch values 0 to 127.

##### **12: MIDI PITCH BEND**

This outputs a -5V to +5V signal from MIDI Pitch Bend values 0 to 127.

##### **13: MIDI CC 1**

This outputs a -5V to +5V signal from MIDI CC 1 values 0 to 127.

##### **14: MIDI CC 2**

This outputs a -5V to +5V signal from MIDI CC 2 values 0 to 127.

##### **15: MIDI CC 4**

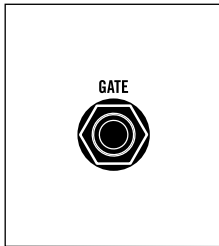
This outputs a -5V to +5V signal from MIDI CC 4 values 0 to 127.

##### **16: MIDI CC 7**

This outputs a -5V to +5V signal from MIDI CC 7 values 0 to 127.

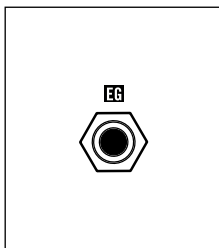
## PATCHBAY INPUTS AND OUTPUTS *(Continued)*

### ■ ENVELOPE GENERATOR



#### **GATE INPUT**

This input accepts a 0 to +5V gate signal to trigger the EG.  
*Tolerant of 10V gates.*

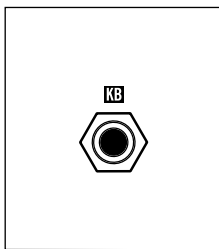


#### **EG OUTPUT**

This is the output of Mother-32's onboard Envelope Generator. Its behavior is directly related to the panel Envelope settings for Attack, Decay and Sustain.  
*(0 to +7.5V)*

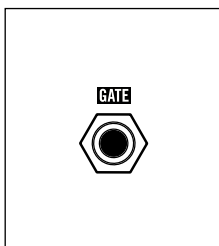
### ■ KEYBOARD

Mother-32 has a 13-note keyboard that is also used to program the sequencer. When a note is played manually, via the sequencer, or by an external MIDI input, a control voltage and gate signal are generated. The control voltage is routed internally to VCO Pitch, while the Gate signal is routed internally to trigger the EG. These signals are also available on the patchbay.



#### **KB OUTPUT**

Each time a new note is played via the keyboard, sequencer, or MIDI controller, a control voltage (-5V to +5V) is output both to Mother-32's onboard oscillator and to the **KB** output jack. This CV output is also affected by the Glide settings and MIDI Pitch Bend messages. The default MIDI Pitch Bend depth is +/- 1 Octave, which is +/-1V at this output.



#### **GATE OUTPUT**

Each time a new note is played via the keyboard, sequencer, or MIDI controller, a +5V Gate signal is output both to Mother-32's Envelope Generator and to the **GATE** output jack.

## PATCHBAY INPUTS AND OUTPUTS *(Continued)*

### ■ CLOCK/TEMPO OVERVIEW

The Mother-32 sequencer runs in musical time, using note durations (quarter note, sixteenth note and so on) based on some tempo in beats per minute. The tempo is set by a “clock”, which in the world of analog sequencers is just an equally spaced series of pulses. Mother-32 can follow its own internal clock, an external clock signal connected to the **TEMPO** input jack, or a MIDI clock signal arriving at the **MIDI IN** port. The Tempo LED located above the **(SHIFT)** button blinks to indicate how fast the sequencer is stepping. The color of the Tempo LED shows the current clock source: red for internal clock or green for external clock (MIDI, or an analog clock connected to the **TEMPO** input).

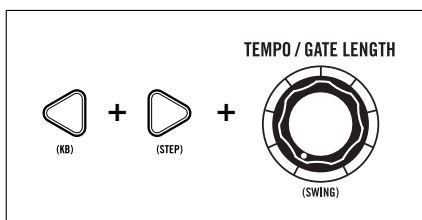
The internal clock Tempo is set by the panel **TEMPO** knob. When using the internal clock, the **TEMPO** knob can vary the base tempo from 20 BPM to 300 BPM. The **TEMPO** knob is also used to set the note value (interchangeably called the clock division) at which the sequencer will advance relative to the clock.

When synchronized to an external clock (analog or MIDI), or if you hold the **(KB)** or **(STEP)** buttons while turning it, the **TEMPO** knob is used to one of the twenty-four available clock division values. These twenty-four values are arranged in three groups of eight; one group for dotted note values, one group for triplet note values, and one for straight timing.

#### HERE ARE THE AVAILABLE CLOCK DIVISION VALUES:

- |    |                    |                             |
|----|--------------------|-----------------------------|
| 1. | Two whole notes    | (dotted, triplet, straight) |
| 2. | Whole note         | (dotted, triplet, straight) |
| 3. | Half note          | (dotted, triplet, straight) |
| 4. | Quarter note       | (dotted, triplet, straight) |
| 5. | Eighth note        | (dotted, triplet, straight) |
| 6. | Sixteenth note     | (dotted, triplet, straight) |
| 7. | Thirty-second note | (dotted, triplet, straight) |
| 8. | Sixty-fourth note  | (dotted, triplet, straight) |

#### HERE IS HOW TO ACCESS THE CLOCK DIVISION VALUES:



##### **DOTTED NOTES**

Hold down the **(KB)** button while rotating the **TEMPO** knob to select one of the eight dotted note values.

##### **TRIPLET NOTES**

Hold down the **(STEP)** button while rotating the **TEMPO** knob to select one of the eight triplet note values.

##### **STRAIGHT NOTES**

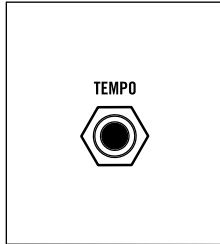
When Mother-32 is synced to MIDI or to an analog clock input, simply rotate the **TEMPO** knob to select one of the eight straight note values. If Mother-32 is synced to the internal clock, then hold down both the **(KB)** and **(STEP)** buttons while rotating the **TEMPO** knob to select one of the eight straight note values.

**NOTE:** The selected clock division will be shown by yellow **OCTAVE / LOCATION** LEDs.

## PATCHBAY INPUTS AND OUTPUTS *(Continued)*

### CLOCK PRIORITY RULES

- 1:** With no other clock source connected, the internal clock has priority.
- 2:** A connected MIDI Clock will override the internal clock.
- 3:** A connected Analog Clock will override a connected MIDI clock, and / or the internal clock.



### TEMPO INPUT

**TEMPO** is a configurable input for modulating the internal clock tempo, or for replacing the internal clock signal. The **TEMPO** input has 4 available modes, which are assigned using the **SETUP** mode. See page 58 for details on selecting the mode for this input.

**NOTE:** By default, the **TEMPO** input accepts a -5V to +5V signal. 0V to +5V is selectable via Setup mode, Page 8, Option 5.

### MODE 1 - TEMPO CV

The input is summed with the position of the **TEMPO** panel knob. With the **TEMPO** knob in the center position, a -5V to +5V control voltage changes the internal clock tempo from minimum to maximum (20 BPM to 300 BPM).

### MODE 2 - SINGLE CLOCK ADVANCE (DEFAULT)

When the input of a clock's rising edge is detected, the internal clock is suppressed, and the Tempo LED is lit green. The pattern is advanced one step for each rising edge detected. If the clock applied is at a steady tempo, then any Ratchets will be performed in synchronization with the incoming clock pulses. A rising edge must be faster than 1V / msec to be detected as an edge, so slowly changing signals will be ignored. In this mode, the **TEMPO** panel knob is ignored. If clock pulses to this input stop, the Mother-32 internal clock may be restarted by pressing **RUN / STOP** or by rotating the **TEMPO** knob.

### MODE 3 - ANALOG CLOCK

Prior to Version 2.0, this mode was fixed at 24 pulses per quarter note (PPQN) and was referred to as "DIN Sync mode." Beginning with Version 2.0, the Analog Clock Mode can be used to synchronize with any regular analog clock signal applied to the **TEMPO** input. The time base for the analog clock input is set on Setup Page 4 (Clock Input PPQN). While the **TEMPO** input is in Analog Clock mode, a clock detected at the **TEMPO** input will override both the internal clock and MIDI sync. Stop the external clock or disconnect it from the **TEMPO** input in order to use internal clock or MIDI sync again.

### MODE 4 - STEP ADDRESS CV

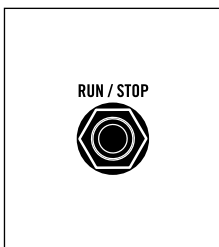
In the Step Address CV mode, the sequencer isn't driven by a clock. Instead, individual sequence steps are selected and played directly based on the CV level received at the **TEMPO** input. The total CV input voltage range is evenly divided across the number of sequence steps in the pattern. Any input voltage within the range allocated to each step will select that step. When the input voltage crosses the division between one step address and another, the new step is played. Smaller voltage changes which do not cross a boundary between step addresses have no effect. A ramp LFO will play the sequence normally, and will be synced to the ramp LFO rate. Experiment with patching in different modulation sources to find fun new playing techniques.

**NOTE:** While in Step Address CV mode, a changing voltage at the **TEMPO** input will override normal playback. Pressing the **RUN / STOP** button will restore normal playback until / unless the voltage at the **TEMPO** input changes again.



## PATCHBAY INPUTS AND OUTPUTS *(Continued)*

### CLOCK/TEMPO *(continued)*

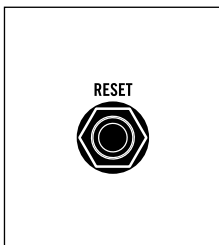


#### **RUN/STOP**

When a +5V signal is applied to this input, the sequencer will play from its current pattern location for the duration that the voltage is applied. When a 0V signal is applied to this input, the sequencer will stop at its current pattern location. The sequencer responds to the last action of either the **RUN/STOP** button or this input.

**NOTE:** An external clock signal applied here will advance the steps of the pattern in the same way repeatedly pressing the **RUN/STOP** button does, but the internal clock is **NOT** synchronized.

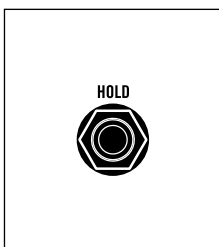
**NOTE:** It is safe to use larger logic levels up to +15V. The minimum level for triggering these inputs is approximately +3.2V.



#### **RESET**

When a +5V signal is applied to this input, the pattern will be reset from its current location and begin playing from step 1. *Step 1 will be repeated as long as +5V is applied to this input.* When the voltage drops to 0V, the sequencer will begin to advance from step 1.

**NOTE:** It is safe to use larger logic levels up to +15V. The minimum level for triggering these inputs is approximately +3.2V.



#### **HOLD**

If a +5V signal is applied to this input while the sequencer is running, the current step in the pattern will be repeated at the current tempo. When the voltage drops to 0V, the pattern will begin to advance again.

**NOTE:** It is safe to use larger logic levels up to +15V. The minimum level for triggering these inputs is approximately +3.2V.

## MIDI FUNCTIONS AND IMPLEMENTATION

### **MIDI CHANNEL**

The Default MIDI Channel is 1. The MIDI Channel can be programmed in Setup Mode. See page 59 for details on selecting a MIDI Channel.

### **MIDI NOTE ON**

Mother-32 responds to MIDI Note On messages on the current MIDI Channel (default Channel 1). MIDI Note values received are converted into a 1V/Octave Keyboard CV, and then routed to the VCO and **KB** CV output jack. *MIDI Note 0 corresponds to -5V, and MIDI Note 120 corresponds to +5V. MIDI Note values 121 to 127 will generate the same output as MIDI Note values 109 to 115.*

When a MIDI Note is received, a Gate signal is generated at the **GATE** output for the duration of the MIDI Note On event. When the sequencer is running, MIDI Note On messages will transpose the pattern in both Keyboard and Step mode. In the KB mode Record function and the Step mode Step Edit function, MIDI Notes received will enter note values into the step currently being edited.

## MIDI FUNCTIONS AND IMPLEMENTATION *(Continued)*

### MIDI NOTE ON VELOCITY

Each MIDI Note On message contains a Velocity value. MIDI Note On Velocity values from 0 to 127 can be output from the Assignable output as a -5V to +5V CV signal. This is programmed in Setup mode. In the KB mode Record function and the Step mode Step Edit function, MIDI Note On Velocity values 96 or greater will turn Accent **ON** for the currently edited step. Velocity values less than 96 will turn the Accent **OFF** for the current step. See page 59 for details on assigning Velocity to the Assignable output jack.

### MIDI PITCH BEND

MIDI pitch bend messages are added to, or subtracted from the Keyboard CV signal. The Mother-32 default Pitch Bend amount is +/-1 Octave. MIDI Pitch Bend can be output as a -5V to +5V signal on the Assignable output. This is programmed in Setup mode. See page 59 for details on assigning Pitch Bend to the Assignable output jack. MIDI Pitch Bend amount can be set from +/-0 to +/-12 semitones using MIDI Pitch Bend Depth RPN (CC101 value 0, CC100 value 0, CC6 values 0 to 12).

### MIDI CONTROL CHANGE (CC) MESSAGES

The following MIDI CC messages are received by Mother-32:

**CC 5:** Portamento Time

**CC 65:** Portamento On/Off

**CC 64:** Sustain

**CC 1,2,4,7:** Used to generate CVs at the **ASSIGNABLE OUTPUT**

### MIDI PROGRAM CHANGE MESSAGES

MIDI Program changes 1 to 64 select the current sequencer pattern location.

MIDI Program changes 71 to 86 select one of the 16 Assignable output modes.

MIDI Channel Aftertouch can be output as a -5V to +5V signal on the assignable output.

### MIDI SYSTEM REAL TIME MESSAGES

**MIDI CLOCK MESSAGES:** When Mother-32 detects a MIDI Clock signal, the Tempo LED blinks green at the detected tempo and the panel **TEMPO** knob becomes a clock divider. After MIDI clock messages cease to be received, the internal clock can be restarted by pressing the **RUN/STOP** button.

**MIDI START:** A MIDI Start message runs the pattern from Step 1.

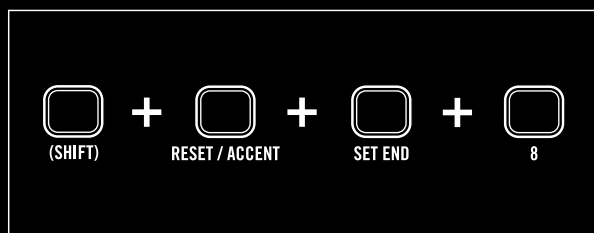
**MIDI STOP:** A MIDI Stop message stops the pattern on the last active step.

**MIDI CONTINUE:** A MIDI Continue message will start the pattern on the next active step.

# SETUP MODE

Setup mode is a non-performance mode that uses the Keyboard and sequencer buttons to access certain Mother-32 parameters (MIDI Channel, Assignable Output, etc.) and to specify their values.

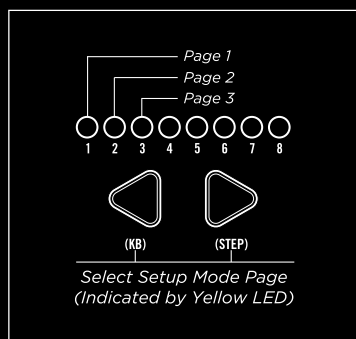
**NOTE:** Settings made in Setup mode are remembered on power down.



## ENTER SETUP MODE

Press **(SHIFT) + RESET + SET END + STEP 8** buttons. The Tempo LED will flash yellow, and the **OCTAVE/LOCATION** LEDs will show a single yellow LED indicating the currently-active Setup mode page. Setup mode values are shown using a green or red **OCTAVE/LOCATION** LED.

**NOTE:** The same button combo will exit Setup mode.



## SELECTING A PAGE

Use the **(KB)** and **(STEP)** arrows to select a Setup mode page (page 7 is reserved and is not selectable). **Yellow OCTAVE / LOCATION LEDs indicate the current Setup mode page.**

**PAGE 1:** ASSIGNABLE Output jack function (default is sequencer clock)

**PAGE 2:** MIDI channel selection

**PAGE 3:** TEMPO Input jack mode

**PAGE 4:** Clock Input PPQN

**PAGE 5:** Clock Output PPQN

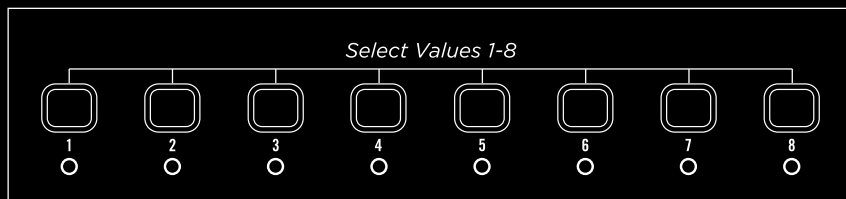
**PAGE 6:** Save mode

**PAGE 7:** [Reserved]

**PAGE 8:** On / Off Settings

## SELECTING A PARAMETER

Each Page may contain up to 16 value options. **(STEP)** buttons 1-8 select values 1-8. The value is indicated by green **OCTAVE/LOCATION** LEDs.



To access values 9-16, press **(SHIFT) + (STEP)** buttons 1-8 (9-16). The value is indicated by red **OCTAVE / LOCATION** LEDs.

**NOTE:** If the Parameter number is the same as the current Page number, the LED will alternately flash between the yellow Page color and the green (1-8) or red (9-16) Parameter color.

## SETUP MODE *(Continued)*

### PAGE 1: ASSIGNABLE OUTPUT JACK

From this page, you can specify which Mother-32 signal is available via the **ASSIGN** output jack. Full descriptions of each option can be found in the **ASSIGN OUTPUT** section of this manual on page 52.

- |                                     |                                           |
|-------------------------------------|-------------------------------------------|
| <b>1:</b> Accent                    | <b>9:</b> Sequencer Step 1 Trigger Output |
| <b>2:</b> Sequencer Clock (Default) | <b>10:</b> MIDI Velocity                  |
| <b>3:</b> Sequencer Clock / 2       | <b>11:</b> MIDI Channel Pressure          |
| <b>4:</b> Sequencer Clock / 4       | <b>12:</b> MIDI Pitch Bend                |
| <b>5:</b> Sequencer Step Ramp       | <b>13:</b> MIDI CC 1                      |
| <b>6:</b> Sequencer Step Saw        | <b>14:</b> MIDI CC 2                      |
| <b>7:</b> Sequencer Step Triangle   | <b>15:</b> MIDI CC 4                      |
| <b>8:</b> Sequencer Step Random     | <b>16:</b> MIDI CC 7                      |

### PAGE 2: MIDI CHANNEL

Here you can set the MIDI Channel your Mother-32 will use to send and receive MIDI data.

- |                          |                            |
|--------------------------|----------------------------|
| <b>1:</b> MIDI Channel 1 | <b>9:</b> MIDI Channel 9   |
| <b>2:</b> MIDI Channel 2 | <b>10:</b> MIDI Channel 10 |
| <b>3:</b> MIDI Channel 3 | <b>11:</b> MIDI Channel 11 |
| <b>4:</b> MIDI Channel 4 | <b>12:</b> MIDI Channel 12 |
| <b>5:</b> MIDI Channel 5 | <b>13:</b> MIDI Channel 13 |
| <b>6:</b> MIDI Channel 6 | <b>14:</b> MIDI Channel 14 |
| <b>7:</b> MIDI Channel 7 | <b>15:</b> MIDI Channel 15 |
| <b>8:</b> MIDI Channel 8 | <b>16:</b> MIDI Channel 16 |

### PAGE 3: TEMPO INPUT JACK MODE

This page allows you to specify the operating mode for the **TEMPO** input jack. The full descriptions of each mode can be found under the **TEMPO INPUT** section of this manual on page 55.

- 1:** CV Input mode
- 2:** Single Clock Advance mode
- 3:** Analog Clock mode (revised in Version 2.0)
- 4:** Step Address CV mode (added in Version 2.0)

### PAGE 4: CLOCK INPUT PPQN (Pulse Per Quarter Note)

Here you can set the number of incoming clock pulses that will equal one quarter note.

**NOTE:** 24 PPQN is used by the DIN SYNC standard; 48 PPQN is used by some older drum machines

- |                  |                    |
|------------------|--------------------|
| <b>1:</b> 1 PPQN | <b>9:</b> 9 PPQN   |
| <b>2:</b> 2 PPQN | <b>10:</b> 10 PPQN |
| <b>3:</b> 3 PPQN | <b>11:</b> 11 PPQN |
| <b>4:</b> 4 PPQN | <b>12:</b> 12 PPQN |
| <b>5:</b> 5 PPQN | <b>13:</b> 13 PPQN |
| <b>6:</b> 6 PPQN | <b>14:</b> 14 PPQN |
| <b>7:</b> 7 PPQN | <b>15:</b> 24 PPQN |
| <b>8:</b> 8 PPQN | <b>16:</b> 48 PPQN |

## SETUP MODE *(Continued)*

### PAGE 5: CLOCK OUTPUT PPQN (Pulse Per Quarter Note)

Here you can set the number of outgoing clock pulses that will equal one quarter note.

**NOTE:** 24 PPQN is used by the DIN SYNC standard; 48 PPQN is used by some older drum machines

<b>1:</b>	1 PPQN	<b>9:</b>	9 PPQN
<b>2:</b>	2 PPQN	<b>10:</b>	10 PPQN
<b>3:</b>	3 PPQN	<b>11:</b>	11 PPQN
<b>4:</b>	4 PPQN	<b>12:</b>	12 PPQN
<b>5:</b>	5 PPQN	<b>13:</b>	13 PPQN
<b>6:</b>	6 PPQN	<b>14:</b>	14 PPQN
<b>7:</b>	7 PPQN	<b>15:</b>	24 PPQN
<b>8:</b>	8 PPQN	<b>16:</b>	48 PPQN

### PAGE 6: SAVE MODE

This page allows you to specify the Save mode for your Mother-32. The full descriptions of each mode can be found under the **SAVING A PATTERN** section of this manual on page 31.

- 1:** Manual Save mode
- 2:** Auto Save mode
- 3:** Write Protect mode

### PAGE 7: [RESERVED]

There are no user accessible parameters on this Page.

### PAGE 8: ON / OFF PARAMETERS

The parameters available on this page can be toggled On or Off so that your Mother-32 will behave in a way conducive to your creative process.

- 1: Follow MIDI Clock (On / Off)**
- 2: Follow MIDI Start Stop (On / Off)**
- 3: Clock Output Swing (On / Off)**
- 4: Accent Out CV Only**
  - ON:** The internal Accent circuit is disabled when the **ASSIGN** Output Jack is set to Accent (Page 1; Parameter 1).
  - OFF:** The internal Accent circuit is enabled.
- 5: Tempo Input Range**
  - ON:** The voltage range of the **TEMPO** input is 0V to +5V
  - OFF:** The voltage range of the **TEMPO** input is -5V to +5V
- 6: Delay Pattern Change**
  - ON:** When a new Pattern is selected, the sequencer will finish playing the current pattern before switching to the new pattern
  - OFF:** When a new Pattern is selected, the sequencer will begin to play the new pattern immediately.
- 7: Load Saved Timing**
  - ON:** When a new Pattern is selected, the timing settings (Clock Division, Swing Interval, and Swing Amount) that were saved with the pattern will be restored.
  - OFF:** When a new Pattern is selected, the previously-active timing settings will remain unchanged.

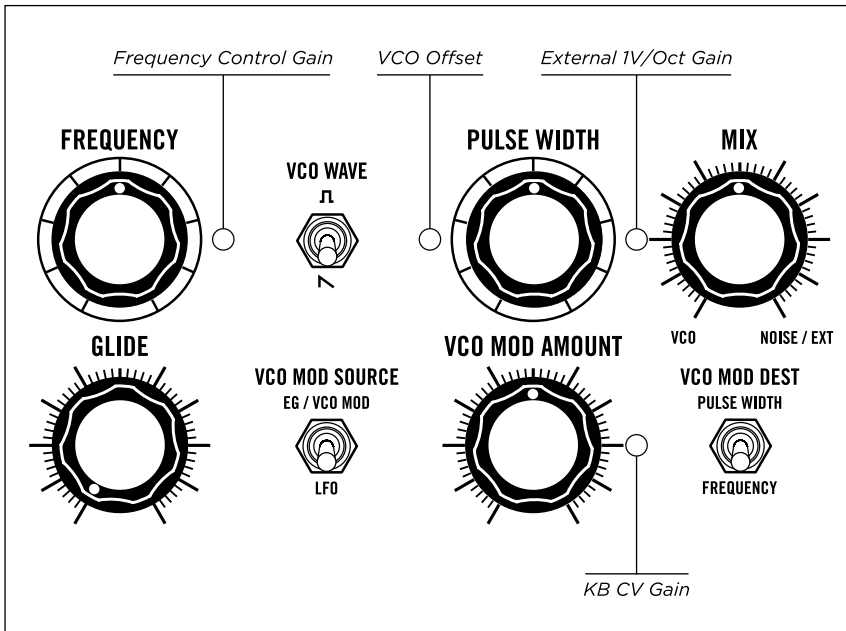
## ■ SETUP MODE GLOBAL DEFAULTS

<b>PAGE 1:</b>	Assignable Output Jack	Sequencer Clock Output
<b>PAGE 2:</b>	MIDI Channel Selection	Channel 1
<b>PAGE 3:</b>	TEMPO Input jack	Step Advance / Trigger
<b>PAGE 4:</b>	Clock Input PPQN	4 (sixteenth note)
<b>PAGE 5:</b>	Clock Output PPQN	4 (sixteenth note)
<b>PAGE 8:</b>	Follow MIDI Clock	On
<b>PAGE 8:</b>	Follow MIDI Start / Stop	On
<b>PAGE 8:</b>	Clock Output Swing	On
<b>PAGE 8:</b>	Tempo Input Range	Off (-5V to +5V)
<b>PAGE 8:</b>	Accent Out CV Only	Off
<b>PAGE 8:</b>	Load Saved Timing	On

## VCO CALIBRATION

Your Mother-32 is fully calibrated at the factory before packaging and shipping. Because it is designed to play with external analog gear, which may or may not be well-calibrated, provisions have been made for tuning the VCO without opening the unit.

There are 4 small holes in the front panel to access the most important calibrations for the VCO: VCO Offset, Frequency Control Gain, External 1V/Oct Gain, and KB CV Gain.



A calibration tool has been included with your Mother-32 in the event that you need to tune the instrument to the analog or modular gear in your setup. Keep in mind that the internal tuning trimpots are not designed for unlimited use.

**IMPORTANT:** Only calibrate your Mother-32 when it is absolutely necessary.

**NOTE:** If you have a lot of analog gear, you may want to look into obtaining a precision voltmeter for voltage measurements.

## ■ CALIBRATION STEPS

### WHAT YOU NEED

- A wide ranging and accurate tuner.
- The included calibration tool.
- A 1 V/Octave source (One that is confirmed to be well calibrated - no more than 1 mV error per octave).

1. Make sure your Mother-32 has been powered on for at least 15 minutes, and that it is in a place where the temperature will not change drastically while performing the calibration.
2. Remove all patch cables from the patchbay.
3. Set the panel settings to a basic sawtooth sound by following the default settings on page 9.
4. Connect the **AUDIO OUT** to an accurate, high-quality tuner.
5. Set the **VCA MODE** to **ON**.
6. Ensure you are in **KB** mode with the Record function Off.
7. Set the **FREQUENCY** control precisely to center position.
8. Make sure the **VCO MOD AMOUNT** control is turned completely Off.
9. Set the Keyboard Octave to “5” and press low C (Step 1) on the keyboard (KB CV outputs 0V).
10. Verify that the pitch is Middle C (C4 - 261.6Hz). Adjust the VCO Offset trimpot **ONLY if necessary**.
11. Set the Mother-32 Octave to 7 and play the lowest C (Step 1).
12. Verify that the pitch is 2 octaves higher (C6 - 1046.5Hz). Note that a pitch within 2 to 3 cents of the target frequency should be fine. Adjust the KB CV Gain trimpot **ONLY if necessary**.
13. Repeat steps 9 to 12 to recheck the tuning and make adjustments **ONLY if necessary**.
14. Now set the Keyboard Octave to “5” and press the low C on the keyboard (KB CV outputs 0V).
15. Connect a properly calibrated, 1V/Octave source outputting 0V (C4) to the **VCO 1V/OCT** input jack.
16. Verify that the pitch remains the same. A large offset may indicate an issue with a cable, a connector, or with the calibration of your CV source.
17. Change the 1V/Octave CV source to output +2V (C6).
18. Verify the pitch is 2 octaves higher (C6 - 1046.5Hz). Note that a pitch within 2 to 3 cents of the target frequency should be fine. Adjust the External 1 V/Oct Gain trimpot **ONLY if necessary**.
19. Repeat steps 15-18 to recheck the tuning.

# USING MOTHER-32 AS A EURORACK MODULE

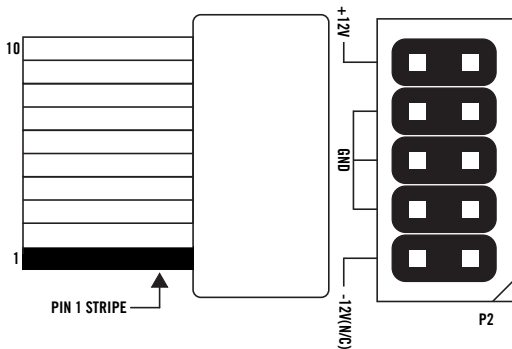
Mother-32 can be removed from its case, and easily installed into a Eurorack system as a 60HP module. Before doing this, it is important to note that Mother-32 draws a *maximum* of 230mA from a +12V supply. It does not use the -12V supply at all.

Make sure there is enough headroom on the +12V supply in your system to power Mother-32. *You will need to know the current rating of the system's +12VDC supply, and the current draw of the +12VDC supply for all modules in the system combined. The sum of all current draw at +12VDC should never exceed the power supply rating. Note that it is good practice to leave some headroom to reduce stress on the supply.*

**Moog accepts NO responsibility or liability for improperly installed modules.**

## TO INSTALL MOTHER-32 IN A EURORACK SYSTEM

1. Disconnect external power from the unit.
2. Remove the eight black M3 screws on the front panel and keep them somewhere safe.
3. Lift the panel slowly from the bottom so you can see the two cables going to the Front Panel module.
4. Disconnect the two cables from the front panel. Now the module is free from its enclosure.



5. Look at the back of your Mother-32 module. There is a 10-pin power header on the back of the PCB that accepts a 10-pin Eurorack power ribbon cable.

6. Connect PIN-1 (-12V) of the power ribbon cable to PIN-1 of the Mother-32 Eurorack power header. The darkened wire (typically red) on the ribbon cable indicates the PIN-1 (-12V) side of the cable.

7. After power is connected, your Mother-32 may be installed into the rails of the Eurorack system case with the eight black M3 screws.

8. Once fully installed, you may power up your Eurorack system.



# PRESETS *Additional presets and blank patch sheets can be downloaded at [www.moogmusic.com](http://www.moogmusic.com)*

## OCTAVE BOUNCE BACK *Adjust VC MIX to control tuning.*

This patch sheet for the Moog Mother-32 is titled "OCTAVE BOUNCE BACK" and includes the instruction "Adjust VC MIX to control tuning." The interface features a grid of 24 knobs and 16 buttons. The knobs are labeled: FREQUENCY, PULSE WIDTH, MIX, CUTOFF (200Hz to 2KHz), RESONANCE, VOLUME, GLIDE, VCO MOD SOURCE (EG/VCO MOD, LFO), VCO MOD AMOUNT, VCO MOD DEST (PULSE WIDTH, FREQUENCY), VCF MODE (HI PASS, LOW PASS), VCF MOD SOURCE (EG, LFO), VCF MOD AMOUNT, VCF MOD POLARITY, TEMPO / GATE LENGTH, LFO RATE, LFO WAVE (S, A), ATTACK, SUSTAIN (ON/OFF), DECAY, and VC MIX (LO/MIX 1, HI/MIX 2). The buttons include MIDI IN (SWING), HOLD / REST, RESET / ACCENT (SHIFT), RUN / STOP (REC), PATTERN (BANK) 1-8, OCTAVE / LOCATION 1-8, and numeric buttons 0-9. The Moog logo and "MOTHER-32 SEMI-MODULAR ANALOG SYNTHESIZER" are at the bottom.

## NOISE TRANSIENT

This patch sheet for the Moog Mother-32 is titled "NOISE TRANSIENT." It features the same control layout as the previous patch sheet, including knobs for Frequency, Pulse Width, Mix, Cutoff, Resonance, Volume, Glide, VCO Mod Source, VCO Mod Amount, VCO Mod Dest, VCF Mode, VCF Mod Source, VCF Mod Amount, VCF Mod Polarity, Tempo/Gate Length, LFO Rate, LFO Wave, Attack, Sustain, Decay, and VC Mix. The buttons include MIDI In, Hold/Rest, Reset/Accent, Run/Stop, Pattern, Octave/Location, and numeric buttons. The Moog logo and "MOTHER-32 SEMI-MODULAR ANALOG SYNTHESIZER" are at the bottom.

## METAL SNARE

This patch sheet for the Moog Mother-32 is titled "METAL SNARE." It features the same control layout as the previous patch sheets, including knobs for Frequency, Pulse Width, Mix, Cutoff, Resonance, Volume, Glide, VCO Mod Source, VCO Mod Amount, VCO Mod Dest, VCF Mode, VCF Mod Source, VCF Mod Amount, VCF Mod Polarity, Tempo/Gate Length, LFO Rate, LFO Wave, Attack, Sustain, Decay, and VC Mix. The buttons include MIDI In, Hold/Rest, Reset/Accent, Run/Stop, Pattern, Octave/Location, and numeric buttons. The Moog logo and "MOTHER-32 SEMI-MODULAR ANALOG SYNTHESIZER" are at the bottom.

## SEQUENCER BASS

**FREQUENCY** **PULSE WIDTH** **MIX** **CUTOFF** **RESONANCE** **VOLUME**

**GLIDE** **VCO MOD SOURCE** **VCO MOD AMOUNT** **VCO MOD DEST** **VCF MODE** **VCF MOD SOURCE** **VCF MOD AMOUNT** **VCF MOD POLARITY**

**TEMPO / GATE LENGTH** **LFO RATE** **LFO WAVE** **ATTACK** **SUSTAIN** **DECAY** **VC MIX**

**MIDI IN** **HOLD / REST** **RESET / ACCENT** **SHIFT** **PATTERN (BANK)** **OCTAVE / LOCATION** **1-8** **9-16** **17-24** **25-32** **SET END** **LO / MIX 1** **HI / MIX 2**

**MOTHER-32** | SEMI-MODULAR ANALOG SYNTHESIZER **mæog**

**IN / OUT** **EXT. AUDIO** **MIX CV** **VCA CV** **VCA** **NOISE** **VCF CUTOFF** **VCF RES.** **VCF** **VCO 1/VCO2** **VCO L/FM** **VCO S/W** **VCF PULSE** **VCO MOD** **LFO RATE** **LFO TR1** **LFO SO** **MIX 1** **MIX 2** **VC MIX CTRL** **VC MIX** **MULT** **MULT 1** **MULT 2** **ASSIGN** **GATE** **EQ** **EQ** **GATE** **TEMPO** **RUN / STOP** **RESET** **HOLD**

## RESONANT HIGH PASS FILTER

**FREQUENCY** **PULSE WIDTH** **MIX** **CUTOFF** **RESONANCE** **VOLUME**

**GLIDE** **VCO MOD SOURCE** **VCO MOD AMOUNT** **VCO MOD DEST** **VCF MODE** **VCF MOD SOURCE** **VCF MOD AMOUNT** **VCF MOD POLARITY**

**TEMPO / GATE LENGTH** **LFO RATE** **LFO WAVE** **ATTACK** **SUSTAIN** **DECAY** **VC MIX**

**MIDI IN** **HOLD / REST** **RESET / ACCENT** **SHIFT** **PATTERN (BANK)** **OCTAVE / LOCATION** **1-8** **9-16** **17-24** **25-32** **SET END** **LO / MIX 1** **HI / MIX 2**

**MOTHER-32** | SEMI-MODULAR ANALOG SYNTHESIZER **mæog**

**IN / OUT** **EXT. AUDIO** **MIX CV** **VCA CV** **VCA** **NOISE** **VCF CUTOFF** **VCF RES.** **VCF** **VCO 1/VCO2** **VCO L/FM** **VCO S/W** **VCF PULSE** **VCO MOD** **LFO RATE** **LFO TR1** **LFO SO** **MIX 1** **MIX 2** **VC MIX CTRL** **VC MIX** **MULT** **MULT 1** **MULT 2** **ASSIGN** **GATE** **EQ** **EQ** **GATE** **TEMPO** **RUN / STOP** **RESET** **HOLD**

## 8-BIT PERCUSSION

**FREQUENCY** **PULSE WIDTH** **MIX** **CUTOFF** **RESONANCE** **VOLUME**

**GLIDE** **VCO MOD SOURCE** **VCO MOD AMOUNT** **VCO MOD DEST** **VCF MODE** **VCF MOD SOURCE** **VCF MOD AMOUNT** **VCF MOD POLARITY**

**TEMPO / GATE LENGTH** **LFO RATE** **LFO WAVE** **ATTACK** **SUSTAIN** **DECAY** **VC MIX**

**MIDI IN** **HOLD / REST** **RESET / ACCENT** **SHIFT** **PATTERN (BANK)** **OCTAVE / LOCATION** **1-8** **9-16** **17-24** **25-32** **SET END** **LO / MIX 1** **HI / MIX 2**

**MOTHER-32** | SEMI-MODULAR ANALOG SYNTHESIZER **mæog**

**IN / OUT** **EXT. AUDIO** **MIX CV** **VCA CV** **VCA** **NOISE** **VCF CUTOFF** **VCF RES.** **VCF** **VCO 1/VCO2** **VCO L/FM** **VCO S/W** **VCF PULSE** **VCO MOD** **LFO RATE** **LFO TR1** **LFO SO** **MIX 1** **MIX 2** **VC MIX CTRL** **VC MIX** **MULT** **MULT 1** **MULT 2** **ASSIGN** **GATE** **EQ** **EQ** **GATE** **TEMPO** **RUN / STOP** **RESET** **HOLD**

# '80S TOMS

**MOTHER-32 SEMI-MODULAR ANALOG SYNTHESIZER**

**moog**

# SHORT BRASS

**MOTHER-32 SEMI-MODULAR ANALOG SYNTHESIZER**

**moog**

# FILTER KICK

**MOTHER-32 SEMI-MODULAR ANALOG SYNTHESIZER**

**moog**

PRESET NAME:

**FREQUENCY** VCO WAVE  $\mu$   $\lambda$

**PULSE WIDTH** **MIX** **CUTOFF** 200Hz 2KHz **RESONANCE** **VOLUME** **VCA MODE** ON EG

**GLIDE** **VCO MOD AMOUNT** VCO NOISE / EXT **VCF MOD AMOUNT** **VCF MOD POLARITY** + -

VCO MOD SOURCE EG / VCO MOD LFO **VCO MOD DEST** PULSE WIDTH FREQUENCY **VCF MODE** HI PASS LOW PASS **VCF MOD SOURCE** EG LFO

**TEMPO / GATE LENGTH** **LFO RATE** **LFO WAVE**  $\mu$   $\lambda$  **ATTACK** **SUSTAIN** ON OFF **DECAY** **VC MIX** LO / MIX 1 HI / MIX 2

**MIDI IN** (SWING) **OCTAVE / LOCATION** 1-8 9-16 17-24 25-32 SET END

HOLD / REST PATTERN (BANK) 1 2 3 4 5 6 7 8 1 2 3 4 5 6 7 8

RESET / ACCENT (SHIFT) RUN / STOP (REC) (KB) (STEP)

**MOTHER-32** SEMI-MODULAR ANALOG SYNTHESIZER **moog**

**IN / OUT** EXT. AUDIO MIX CV VCA CV VCA VCF CUTOFF VCF RES. VCF VCO 1V/OCT VCO LIN FM VCO SAW VCO PULSE VCO MOD LFO RATE LFO TRI LFO SO MIX 1 MIX 2 VC MIX CTRL VC MIX MULT MULT1 MULT2 ASSIGN GATE EG KB GATE TEMPO RUN / STOP RESET HOLD

NOTES:

PRESET NAME:

**FREQUENCY** VCO WAVE  $\mu$   $\lambda$

**PULSE WIDTH** **MIX** **CUTOFF** 200Hz 2KHz **RESONANCE** **VOLUME** **VCA MODE** ON EG

**GLIDE** **VCO MOD AMOUNT** VCO NOISE / EXT **VCF MOD AMOUNT** **VCF MOD POLARITY** + -

VCO MOD SOURCE EG / VCO MOD LFO **VCO MOD DEST** PULSE WIDTH FREQUENCY **VCF MODE** HI PASS LOW PASS **VCF MOD SOURCE** EG LFO

**TEMPO / GATE LENGTH** **LFO RATE** **LFO WAVE**  $\mu$   $\lambda$  **ATTACK** **SUSTAIN** ON OFF **DECAY** **VC MIX** LO / MIX 1 HI / MIX 2

**MIDI IN** (SWING) **OCTAVE / LOCATION** 1-8 9-16 17-24 25-32 SET END

HOLD / REST PATTERN (BANK) 1 2 3 4 5 6 7 8 1 2 3 4 5 6 7 8

RESET / ACCENT (SHIFT) RUN / STOP (REC) (KB) (STEP)

**MOTHER-32** SEMI-MODULAR ANALOG SYNTHESIZER **moog**

**IN / OUT** EXT. AUDIO MIX CV VCA CV VCA VCF CUTOFF VCF RES. VCF VCO 1V/OCT VCO LIN FM VCO SAW VCO PULSE VCO MOD LFO RATE LFO TRI LFO SO MIX 1 MIX 2 VC MIX CTRL VC MIX MULT MULT1 MULT2 ASSIGN GATE EG KB GATE TEMPO RUN / STOP RESET HOLD

NOTES:

PRESET NAME:

The control panel for the MOTHER-32 synthesizer features a variety of parameters and controls:

- Frequency:** Knob for setting the VCO frequency.
- Pulse Width:** Knob for setting the VCO pulse width.
- Mix:** Knob for setting the VCO noise/external mix.
- Cutoff:** Knob for setting the VCF cutoff frequency, with 200Hz and 20KHz markers.
- Resonance:** Knob for setting the VCF resonance.
- Volume:** Knob for setting the VCA volume.
- Glide:** Knob for setting the VCO glide.
- VCO Mod Amount:** Knob for setting the VCO modulation amount.
- VCO Mod Dest:** Knob for selecting the VCO modulation destination (Pulse Width or Frequency).
- VCF Mod Amount:** Knob for setting the VCF modulation amount.
- VCF Mod Source:** Knob for selecting the VCF modulation source (EG or LFO).
- VCF Mod Polarity:** Knob for setting the VCF modulation polarity (+ or -).
- Tempo / Gate Length:** Knob for setting the tempo or gate length.
- LFO Rate:** Knob for setting the LFO rate.
- LFO Wave:** Knob for selecting the LFO wave shape.
- Attack:** Knob for setting the VCF attack time.
- Sustain:** Knob for setting the VCF sustain level (ON or OFF).
- Decay:** Knob for setting the VCF decay time.
- VC Mix:** Knob for setting the VC mix (LO / MIX 1 or HI / MIX 2).
- MIDI In:** A 5-pin MIDI connector.
- Buttons:** HOLD / REST, RESET / ACCENT, PATTERN (BANK) 1-8, RUN / STOP (REC), OCTAVE / LOCATION 1-8, and a STEP button.
- IN / OUT:** A grid of 16 hexagonal buttons for routing and processing, including EXT. AUDIO, MIX CV, VCA CV, VCA, NOISE, VCF CUTOFF, VCF RES., VCF, VCO 1V/OCT, VCO LIN FM, VCO SAW, VCO PULSE, VCO MOD, LFO RATE, LFO TRI, LFO SO, MIX 1, MIX 2, VC MIX CTRL, VC MIX, MULT, MULT 1, MULT 2, ASSIGN, GATE, EG, KB, GATE, and TEMPO.

**MOTHER-32** | SEMI-MODULAR ANALOG SYNTHESIZER

meoq

NOTES:

PRESET NAME:

This is an identical copy of the MOTHER-32 control panel described above.

NOTES:

PRESET NAME:

**MOTHER-32** | SEMI-MODULAR ANALOG SYNTHESIZER

**meoq**

The control panel features a grid of knobs and buttons. The top row includes knobs for Frequency, Pulse Width, Mix, Cutoff (200Hz to 20kHz), Resonance, and Volume. The second row has Glide, VCO Mod Amount, VCO Mod Dest, VCF Mode, VCF Mod Source, and VCF Mod Amount. The third row contains Tempo/Gate Length, LFO Rate, LFO Wave, Attack, Sustain, Decay, and VC Mix. The bottom section includes MIDI In, Hold/Rest, Pattern/Bank, Octave/Location, and various function buttons like Run/Stop, Reset, and Hold. A vertical strip on the right side contains a column of buttons labeled 'IN / OUT'.

NOTES:

PRESET NAME:

**MOTHER-32** | SEMI-MODULAR ANALOG SYNTHESIZER

**meoq**

This control panel is identical to the one above, showing the same layout of knobs and buttons for the MOTHER-32 synthesizer.

NOTES:

## ■ SPECIFICATIONS

### ANALOG SOUND ENGINE

**POLYPHONY:** Monophonic

**KEYS:** 13 Momentary Pads

**SOURCES:** VCO, Noise, External Audio Source

**FILTER:** Switchable Lo-Pass /Hi Pass 4-Pole (-24 dB/Octave) Moog filter

**ENVELOPE:** VCF and / or VCA (Attack, Decay)

**MODULATION:** Low Frequency Oscillator (LFO), Envelope Generator (EG), external.

### ANALOG SEQUENCER

**PATTERNS:** 8 Banks of 8 Patterns

**STEPS:** 32 Steps per Pattern

**CLOCK:** Internal, External, MIDI

**SWING:** Swing Amount; Swing Interval

**PLAYBACK ORDER:** Various Modes

### PATCHBAY

**JACKS:** 32 x 3.5mm

**INPUTS:** 18 Input Jacks

**OUTPUTS:** 14 Output Jacks

**SPECIAL:** Mult Jacks, VC Mixing

### MIDI

**INPUT:** Din Jack

**DATA:** Note, Clock, CC, etc.

**LED:** Data Present Indicator

### REAR PANEL

**AUDIO:** 1/4" TS Instrument / Headphone Jack

**POWER:** Power Supply connection

**SECURITY:** Kensington Lock slot

### DIMENSIONS

**SIZE (W x D x H inches):** 12.57" x 4.21" (including knob elevation) x 5.24"

**SIZE (W x D x H cm):** 31.93 x 10.69 (including knob elevation) x 13.3

**WEIGHT (lbs):** 3.5

**WEIGHT (kg):** 1.58

### POWER SUPPLY (INCLUDED)

**STYLE:** Wall adapter; barrel connection; center-pin positive

**INPUT:** 100 - 240VAC; 50 Hz - 60 Hz

**OUTPUT:** +12VDC; 1000mA

### POWER CONSUMPTION

**TYPICAL:** 2.8 Watts

### EURORACK SPECS

**CURRENT DRAW:** 230mA (maximum) from +12VDC (10-pin header)

**MOUNTING DIMS:** 60HP (1"/26mm Module Depth)

### ACCESSORIES

The following accessories are available for purchase at authorized Moog dealers:

2-Tier Vertical Rack Kit, 3-Tier Vertical Rack Kit

Gig Bag

6" 3.5 mm Cable Pack (Qty 5), 12" 3.5 mm Cable Pack (Qty 5)

Empty 60HP Case, Empty 104HP Case

Backup Power Supply

## ■ SERVICE AND SUPPORT INFORMATION

### MOOG'S STANDARD WARRANTY

Moog warrants its products to be free of defects in materials or workmanship and conforming to specifications at the time of shipment. The Warranty Period is one year from the date of purchase. If, in Moog's determination, it has been more than five years since the product shipped from our factory, it will be at Moog's discretion whether or not to honor the warranty without regard to the date of the purchase. During the Warranty Period, any defective products will be repaired or replaced, at Moog's option, on a return-to-factory basis. This warranty covers defects that Moog determines are no fault of the user.

The Moog Limited Warranty applies to USA purchasers only. Outside the USA the warranty policy and associated service is determined by the laws of the country of purchase and supported by our local authorized distributor. A listing of our authorized distributors is available at [www.moogmusic.com](http://www.moogmusic.com).

If you purchase outside of your country, you can expect to be charged for warranty as well as non-warranty service by the service center in your country.

### RETURNING YOUR PRODUCT TO MOOG MUSIC

You must obtain prior approval in the form of an RMA (Return Material Authorization) number from Moog before returning any product. Email [techsupport@moogmusic.com](mailto:techsupport@moogmusic.com) for the RMA number or call us at +1 (828) 251-0090. All products must be packed carefully and shipped with the Moog supplied power adapter. Mother-32 must be returned in the original inner packing including the cardboard inserts. The warranty will not be honored if the product is not properly packed. Once you have received the RMA number and carefully packed your Moog Mother-32, ship the product to Moog Music, Inc. with transportation and insurance charges paid, and be sure to include your return shipping address.

**MOOG MUSIC, INC.**  
160 Broadway St.  
Asheville, NC 28801

### WHAT WE WILL DO

Once received, we will examine the product for any obvious signs of user abuse or damage as a result of transport. If the product was abused, was damaged in transit, or is out of warranty, we will contact you with an estimate of the repair cost. If warranty work is performed, Moog will ship and insure your product to your United States address free of charge.

### HOW TO INITIATE YOUR WARRANTY

Please initiate your warranty online at [www.moogmusic.com/register](http://www.moogmusic.com/register). If you do not have web access, please call (828) 251-0090 to register your product.

### CARING FOR MOTHER-32

Clean Mother-32 with a soft, dry cloth only – do not use solvents or abrasive detergents. Heed the safety warnings at the beginning of the manual. Do not drop the unit.

**AN IMPORTANT NOTE ABOUT SAFETY:** *There are no user serviceable parts in Mother-32. Refer all servicing to qualified personnel only.*

©2020 Moog Music, Inc. All rights reserved. **MOOG, MOOG (stylized with design), the MOOG logo and MOTHER-32** are trademarks of Moog Music, Inc. Registered in U.S. Patent and Trademark Office and elsewhere.

### **Mother-32 User Manual Version 2**

*For the most up-to-date user manual and firmware updates, visit [www.moogmusic.com/Mother-32](http://www.moogmusic.com/Mother-32).*

Phone: +1 (828) 251-0090 | Email: [info@moogmusic.com](mailto:info@moogmusic.com) | Website: [www.moogmusic.com](http://www.moogmusic.com)



