SWAM Solo Strings
User Manual

v3.0.0

Audio Modeling

Audio Modeling

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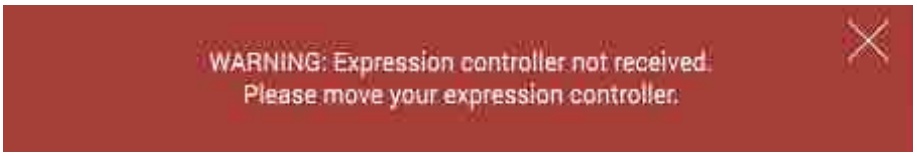
Before you start

Although these instruments are intuitive and easy to play "out-of-the-box", getting excellent results requires a certain amount of practice and experience. Please read this user manual carefully. It contains very important information that will help you achieve the best results in as short a time as possible. In addition, you can listen to the demos on the Audio Modeling website at audiomodeling.com/media.

The latest version of all SWAM manuals can be found at audiomodeling.com/manuals.

All SWAM instruments are designed to be PLAYED in real time by shaping the sound like a real instrumentalist would.

The Desktop version will function on any modern computer (see Specifications), using any host application which supports VST, VST3, Audio Units or AAX plug-in formats, or running as a standalone application. An example host software could be a sequencer or a digital audio workstation (DAW) such as Camelot Pro, Ableton Live, Cubase, Logic, Pro Tools, LUNA, etc.
The iOS version is currently available for iPad only (see Specifications to check what OS version is supported). On this mobile platform, SWAM products come as Standalone, AUv3 plug-ins and Inter-App Audio (IAA) formats. Example host and DAW softwares are Camelot Pro, GarageBand, Cubasis and AUM.
These instruments use Audio Modeling's proprietary SWAM (Synchronous Wave Acoustic Modeling) technology conceived by Stefano Lucato. Combined with Physical Modeling, they provide exceptional playability and realism. The sound is not produced by playing back samples, using pre-recorded articulations; these are complex virtual instruments, capable of shaping almost any kind of articulation and phrasing in real time. They can be played using any MIDI device such as a keyboard, breath or wind controller.
Indeed, it is essential that the instruments are controlled using a suitably capable set of MIDI controllers, as described in this manual.



NOTE: As with a real musical instrument, SWAM instruments allow continuous movement across the full range of dynamics — from *pp* to *ff* — without producing any phasing artifacts.

To accomplish this, it's necessary to use a suitable continuous physical MIDI controller such as an expression or volume pedal (usually CC11 or CC7 MIDI messages), a breath or wind controller (usually CC2 MIDI messages) or one of the many other expressive controllers on the market today.
WITHOUT SUCH A CONTROLLER, THE INSTRUMENT WILL NOT WORK when played in realtime. Instead, it will display the warning "**Expression controller not received. Please move your expression controller.**"
Other physical MIDI controllers, like sliders, knobs or a modulation wheel, can be used for this purpose, although they often do not provide the level of control required for optimal results. Please refer to other sections of this manual for further details.
When used for studio production, it's necessary to provide either a MIDI Expression curve or Automation.

Note: the MIDI note naming convention we use is based on Middle C = C3, corresponding to MIDI note number 60.

Licensing

macOS and Windows

The License Key we provide can be activated on up to four computers at the same time. Refer to the Installation paragraph for instructions on how to authorize SWAM products.

To move an authorization to a different computer, please go to the Customer Portal at my.audiomodeling.com and delete it from the activations list of the corresponding License Key.

The full terms and conditions can be found in the End User License Agreement (EULA) provided with the product. Please refer to the "Installation Path" paragraph of this user manual to locate the EULA on your system.

iPadOS

Licensing on iPadOS is managed by Apple. Please refer to AppStore and Apple terms and conditions.

Specifications

macOS 10.9 (Mavericks) – 11.1 (Big Sur)

- Standalone, Audio Units, VST, VST3, AAX 64bit
- NKS (Native Instruments Komplete Kontrol)

Windows 7, Windows 8, Windows 10

- Standalone, VST, VST3, AAX 64bit
- NKS (Native Instruments Komplete Kontrol)

iPadOS 11 – 14

- Standalone, AUv3, IAA

Required space after installation: 16 MB per single instrument, 80 MB for each whole family, 240 MB for the complete Solo Strings bundle.
RAM occupancy: about 15 MB for each instrument instance.

Installation

macOS and Windows

Product Registration
1) login to our Customer Portal (https://my.audiomodeling.com); create a new account if you have never signed up
2) select "Register a new product"
3) type the License Key or Redemption code provided, select "Next"
4) the portal will send an email to you. Click the confirmation link on the email
5) select "Licenses & Download" to get the latest installer, User Manual and to manage your activations

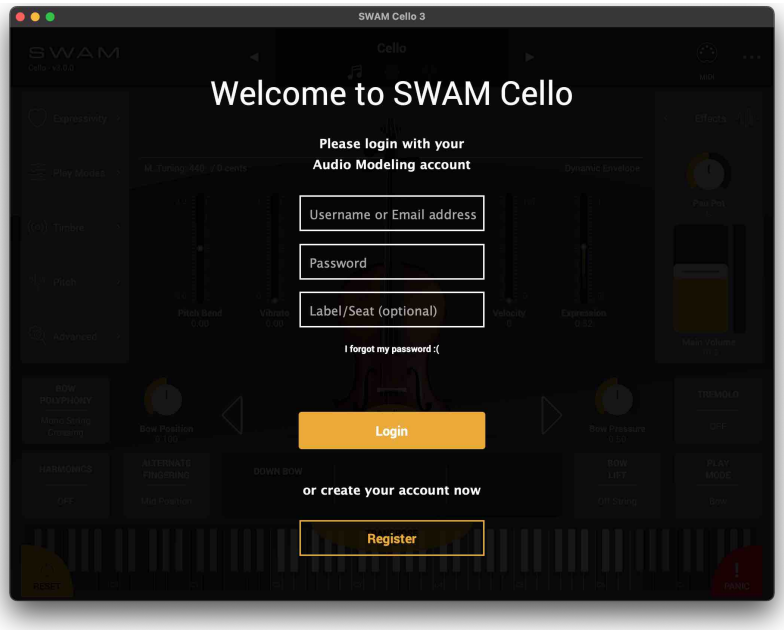
Installation
Unzip/open the archive and run the installer.

If you installed a previous version
You can safely run the installer without launching the uninstaller.

Activation

After the installation, use your Customer Portal **credentials** and press "Login" to authorize the product.

You can optionally fill the **Label/Seat** field that helps to identify where the authorization has been made (e.g. "Laptop" or "Studio"). This label is visible on the Customer Portal, next to the authorization entry corresponding to the user's license key.



NOTE: the product can be activated "**online**" only, i.e. your computer must be connected to the Internet at the time of authorization. If you need to work offline, just connect to the Internet for the time required for the authorization, then disconnect once the authorization is complete.

Installation paths

macOS

- **Standalone app**, End User License Agreement, Uninstaller are located under: /Applications/Audio Modeling/(Product name)
- **Audio Units plug-ins** are located under: /Library/Audio/Plug-Ins/Components
- **VST3 plug-ins** are located under: /Library/Audio/Plug-Ins/VST3
- **VST plug-ins** are located under: /Library/Audio/Plug-Ins/VST
- **AAX plug-ins** are located under: /Library/Application Support/Avid/Audio/Plug-Ins
- **Default presets** and auxiliary resources are stored under: /Users/Shared/Audio Modeling/SWAMv3

Windows

- **Standalone app**, End User License Agreement, Uninstaller are located under:

C:\Program Files\Audio Modeling\(Product name)

- VST3 plug-ins: the installation path will be asked for during the installation
- VST plug-ins: the installation path will be asked for during the installation
- AAX plug-ins are located under: C:\Program Files\Common Files\Avid\Audio\Plug-Ins
- Default presets and auxiliary resources are stored under: C:\Users\Public\Documents\Audio Modeling\SWAMv3

iPadOS

Installation and updates are managed through the AppStore.

Hardware Requirements

Audio interface (sound card)

A good quality audio interface with suitable low-latency drivers is required. On Windows, ASIO drivers are recommended. Suggested settings for buffer size at 44.1 or 48 kHz are 128, 256, or 512 samples (larger buffers provide higher latency, but less CPU load). Onboard audio devices are often suitable on modern computers and iPad.

MIDI devices

SWAM instruments (like any other virtual instrument) can be successfully used without the need for any additional hardware by drawing the controller curves and programming the notes directly in the host sequencer. However, a much more "human" and interactive configuration is recommended, especially when playing in real time, using external MIDI devices: a MIDI keyboard with at least 5 octaves, mod wheel & pitch bend, connected to the computer via USB or an external MIDI interface equipped with a set of physical continuous MIDI controllers (usually knobs or sliders) to control effects like bow pressure, bow position, tremolo, harmonics, etc.
Although the dynamics can be controlled by another physical controller (knob, slider, ribbon, XY-pad), a pedal is highly recommended. As an alternative, a breath controller, such as a Yamaha BC3, TEControl BC and BBC2, Photon by IMOXPLUS, or Hornberg Research HB1, can be used. Woodwind or Brass players may prefer to use a wind controller such as a Yamaha WX or YDS-150, Akai EWI (USB, 4000S or 5000), Aodyo Sylphyo, EMEO, Roland Aerophone, Synthophone, EVI (Electronic Valve Instrument), NuRAD, WARBL, Travel Sax - all of them provide excellent results. MIDI Polyphonic Expression devices like the Seaboard and Lightpad by ROLI, LinnStrument by Roger Linn Design, or the Instrument 1 by Artiphon are fully supported.
Alternative controllers include Neova Ring by Enhancia, Toucé by Expressive E, Sensel Morph, Joué, and Leap Motion by Ultraleap.

Note: on EWI 4000s or similar please do not set the option to mix the pitch-bend or vibrato to breath sensor ("Pb" or "bo" options on EWI 4000s). This can produce unnatural vibrato behavior. SWAM engine applies the right behavioral models to the relationships between pitch and dynamics based on the physics of the instrument. These relationships are different for each musical instrument.

Software Requirements

macOS and Windows

Standalone
We provide a Standalone version of each instrument, please check the Installation Path paragraph of this User Manual to locate the applications.

Plug-ins
A DAW (Digital Audio Workstation) or other host capable of running VST2.4, VST3, Audio Units or AAX plug-ins is needed to run the SWAM instruments. If you do not have a host application capable of running VST or AU plug-ins, you can install a free host application such as Camelot Free for desktop (camelotpro.com).
A list of compatible hosts and DAWs can be found on our Knowledge base:
audiomodeling.com/support.

iPadOS

Standalone
We provide a Standalone App of each SWAM Solo String instrument.

Plug-ins
A DAW (Digital Audio Workstation) or other host capable of running SWAM Solo String instruments as AUv3 or IAA plug-ins is needed.
If you do not have a host application capable of running AUv3 plug-ins, you can get our Camelot Pro live performance host on the AppStore.

Using an appropriate range of Expression

This is an extremely important aspect for getting the optimal expressiveness and realism with virtual instruments.

All real physical instruments require a much greater degree of effort to achieve the highest possible dynamics for that instrument. This is not the case for most physical MIDI controllers; it is indeed very easy to push an expression pedal, or a slider, to the maximum and leave it there forever. Oddly enough, even breath and wind controllers tend to jump very easily to the highest dynamics (unless carefully set), so that the most expressive range (mp to mf) is seldom exploited. This results all too often in the virtual instrument being played in an excessive range of dynamics, leading unavoidably to a poor, unrealistic performance.
Please keep in mind that the key to expressiveness and realism is a proper use of dynamics. Always monitor the input expression value on the main display and adjust the dynamics accordingly. A useful trick is to set the overall monitoring volume fairly high. This automatically prevents any inclination toward over using the higher levels of dynamics.

It's also important to optimize the general volume of your loudspeakers/headphones at an average value of Expression. Too low an output level would easily induce the user to use high Expression levels, usually yielding excessively "biting" sounds.

Introduction

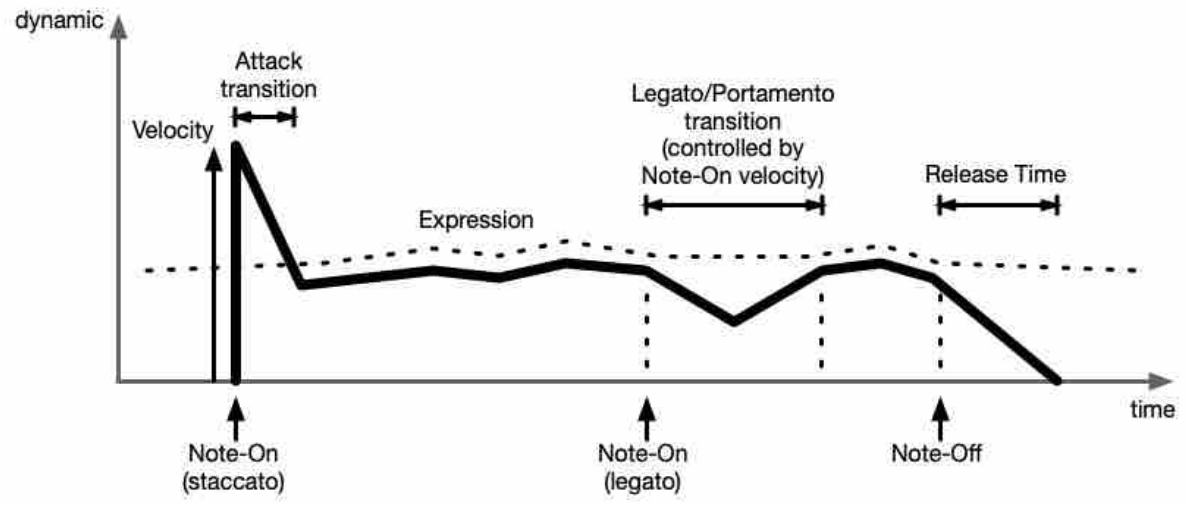
SWAM Solo Strings is a collection of solo string instruments conceived and developed by Stefano Lucato and the Audio Modeling team. These instruments are based on Physical Modeling technology and do not make use of any samples.

The SWAM Solo Strings collection includes four string instruments: Double Bass, Cello, Viola and Violin.

SWAM Solo Strings instruments come as a Standalone application, VST, VST3, Audio Units and AAX plug-ins for Desktop, and Standalone App, AUv3 and IAA plug-ins for iPadOS.

Any SWAM Solo Strings product can be virtually played using a bow or pizzicato with a finger.

In addition to standard SWAM controls such as staccato / legato (with velocity- or CC-controlled portamento time), dynamic expression and vibrato depth and frequency, there are several additional parameters to control the instrument behavior which are specific to bowed or pizzicato string instruments.



Main window

The main window shows the most important parameters, instrument monitors and animations.

Instrument parameters

All parameters have been grouped in six categories:

- Expressivity: parameters that allow the physical player's expressivity to affect the instrument.
- Play Modes: parameters that act on the details of how the emulated player plays the instrument.
- Timbre: parameters that affect the instrument's timbre.
- Pitch: Master Tuning, Pitch, Transposition and microtonal settings.
- Advanced: additional parameters, especially for expert users.
- Effects: audio signal processing applied at the final stage.

The most common and important parameters are presented on the main GUI.

Audio Modeling

Note: currently, some parameters are "locked" on the iPad version. Unlocking through In-App Purchase will be provided in future.

Main controls

- Instrument (left/right arrows)
  Use the arrows to select different instrument bodies with different timbres and characters.
- Bow Polyphony (if Play Mode = Bow)
  [mapped to Key Switches B+C, B+C#, B+D, B+D#, B+E]
  - Mono String Crossing [B+C]: the instrument is monophonic; legato/portamento is achieved by overlapping two notes. If the legato/portamento involves two adjacent strings, the release of the previous note is stopped in order to avoid a "bichord" during the transition, depending on the interval set with the "Mono CrossString Muting" option (see Play Modes page).
  - Mono Poly Release [B+C#]: the instrument is monophonic; legato/portamento is achieved by overlapping two notes. If the legato/portamento involves two adjacent strings, the release of the first note is not stopped during the legato transition.
  - Double [B+D]: two simultaneous notes can be performed; legato and portamento is not possible if playing overlapping notes. The two selected notes are always on adjacent strings. Priority: last pressed note.
  - Double/Hold [B+D#]: two simultaneous notes can be performed; legato and portamento is possible. The two selected notes are always on adjacent strings. Priority: oldest note. The preferred pair of strings is selected using "Double Hold String Selection".
  - Auto [B+E]: two simultaneous initial notes can be performed; the first single note played turns the polyphony to Mono. Legato and portamento are also possible for two simultaneous notes. An additional latency is added at the attack in order to detect the double/mono mode. It is possible to change the detection time acting on the "Auto Poly Detection Time" parameter in the Advanced section.
- Pizzicato Poly (if Play Mode = Pizzicato or Col Legno)
  - Mono String Crossing: the instrument is monophonic; legato/portamento is achieved by overlapping two notes. If the legato/portamento involves two adjacent strings, the release of the previous note is stopped in order to avoid a "bichord" during the transition, depending on the interval set with the "Mono CrossString Muting" option (see Play Modes page).
  - Polyphony: it's possible to play multiple notes if they are distributed across different strings.

- Harmonics
  [mapped to Key Switch F#]

    - OFF: no overtone.
    - 2: first overtone (one octave higher).
    - 3: second overtone (one octave and a fifth higher).
    - 4 Control: overtone selected by the "Harmonics 4 Control" parameter.
- Alternate Fingering
  [mapped to Key Switch D#]
  Selects the default position of the left hand on the fingerboard. Note: in order to obtain a portamento on the same string, it is required to check and eventually set the proper AltFing position of the starting note (BEFORE pressing the starting note) and of the ending note (BEFORE pressing the ending note).
    - Mid Position: left-hand stays in the middle of the neck.
    - Near the Bridge: left-hand stays towards the bridge (high position).
    - Near the Nut + Open: left-hand stays near the nut; it is possible to play open strings. Note: vibrato is not possible on open strings.
- Bow/Pizz Position: position of the bow or finger between "sul ponticello" and "sul tasto".
- Bow Pressure: (if Play Mode = Bow)
  "Weight" of the bow on the string.
- Pizzicato Tone: (if Play Mode = Pizzicato or Col Legno)
  Color of the pizzicato pluck.
- Tremolo
  [mapped to Key Switch G#]
    - OFF: no tremolo.
    - Slow: slow tremolo.
    - Fast: fast tremolo (1.5 x slow tremolo rate).
      Tremolo speed and behavior are controlled by the "Tremolo Min Speed" and "Tremolo Mode" parameters on the Play Modes / Right Hand section. A "manual" tremolo is possible using the Key Switch C# ("Manual Bowing: KeySwitch" parameter set to "Tremolo") or by holding Sustain ("Manual Bowing: Sustain+Note" set to "Tremolo").
- Bow Lift
  [mapped to Key Switch E]
  Selects the starting/ending state of the bow. Note: the BowLift parameter acts mainly on the release, stopping the vibration of the string when it is set to "On String". It also acts slightly on the attack, but if you want to obtain a scratchy sound you should act on the velocity and on the bow pressure.
    - Off String: lift the bow away from the strings during release
    - On String: leaves the bow on the string during release
- Play Mode
  [mapped to Key Switch C]
    - Bow: the instrument is played using the bow
    - Pizzicato: the instrument is played plucking the strings using the fingers
    - Col Legno: the instrument is played striking the strings with the bow

- Sordino
    - OFF: no mute applied
    - ON: a sordino is applied to obtain a muted sound

- RESET:
    - Initialize: reset sound engine parameters and MIDI mapping
    - Advanced:
        - Reload "current preset": reload the current selected preset, losing all changes made from the latest saved settings
        - Sound Engine: reset or load sound engine parameters
        - MIDI Mapping: reset or load MIDI mapping settings
        - Micro Tuning: reset or load micro tuning settings
- PANIC: use this in case of stuck notes

Audio section

- Effects : open the onboard FX section applied to the final stage of the signal flow.
- Pan Pot: pans the output signal left and right.
- Volume: main output volume.

Header section

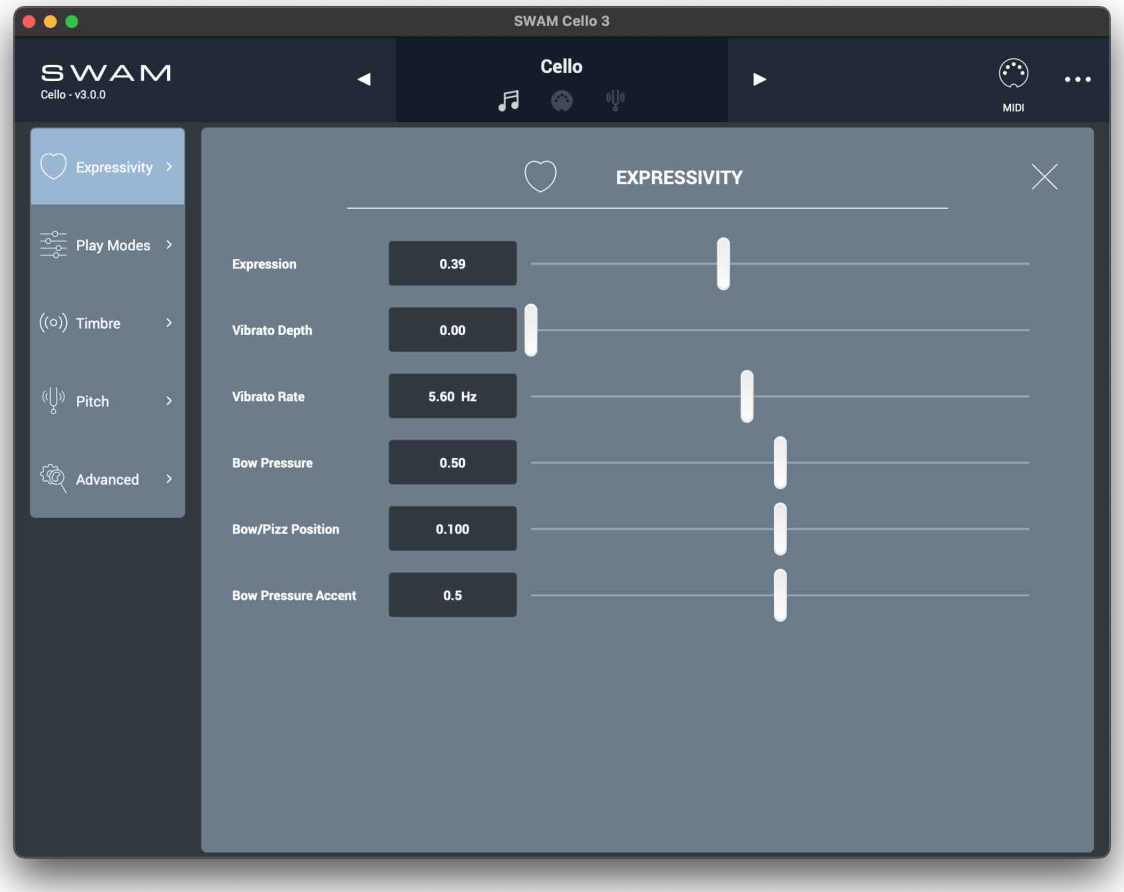
- SWAM logo 

: selecting the SWAM logo opens the Settings section
- Main menu icon 
: opens the main menu page that provides access to:
    - Save & Load
    - Reset
    - Controller Mapping
    - Parameter Lock
    - Import
    - Export
    - Settings
- MIDI Mapping icon 

: open the MIDI mapping management section.
- Playing Surface icon (only for iPadOS version) 

: open the playing surface for playing the instrument on the iPad glass.

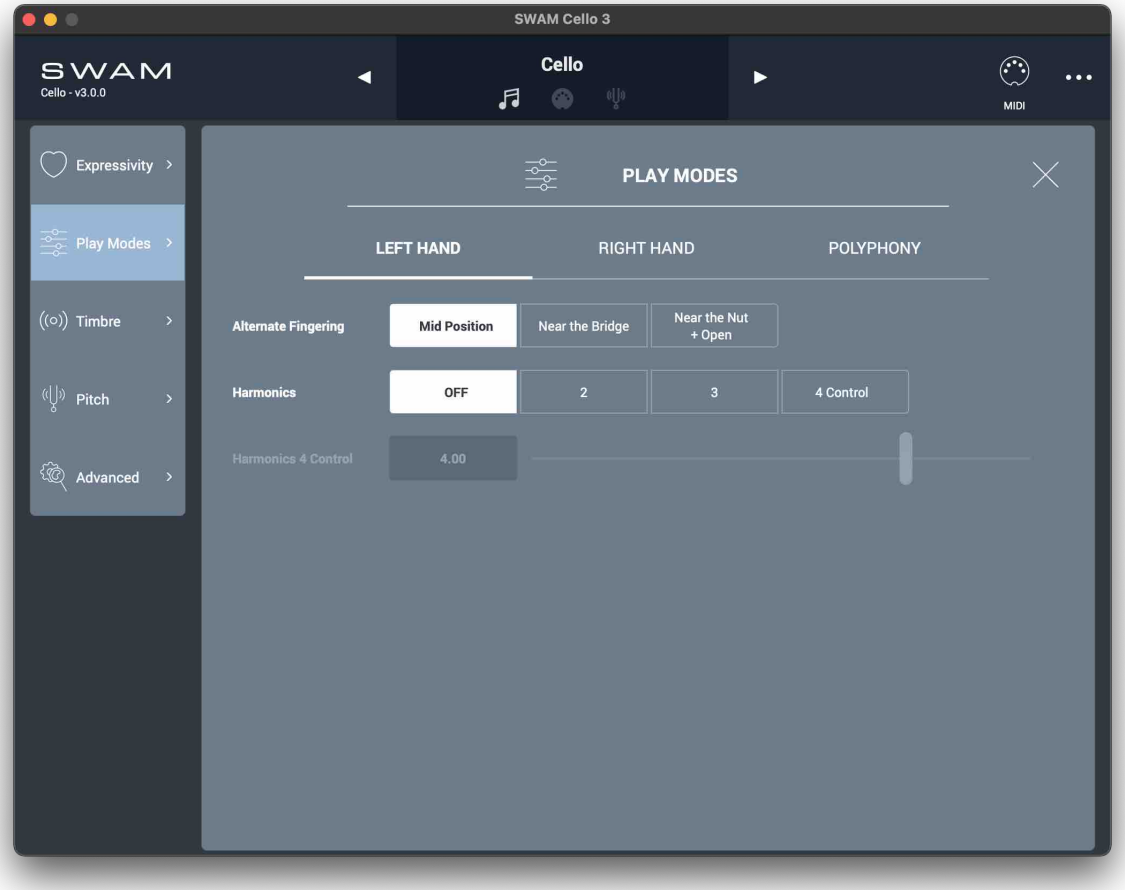
Expressivity



- Expression: main expressive control. On bowed strings, it's mostly related to the bow speed which in turn controls the dynamics.
- Vibrato Depth: controls the amount of vibrato.
- Vibrato Rate: controls the average frequency of the Vibrato applied to the model.
- Bow Pressure: "weight" of the bow on the string.
- Bow/Pizz Position: position of the bow or finger between "sul ponticello" and "sul tasto".
- Bow Pressure Accent: accent amount as a function of the velocity.

Play Modes

Left Hand

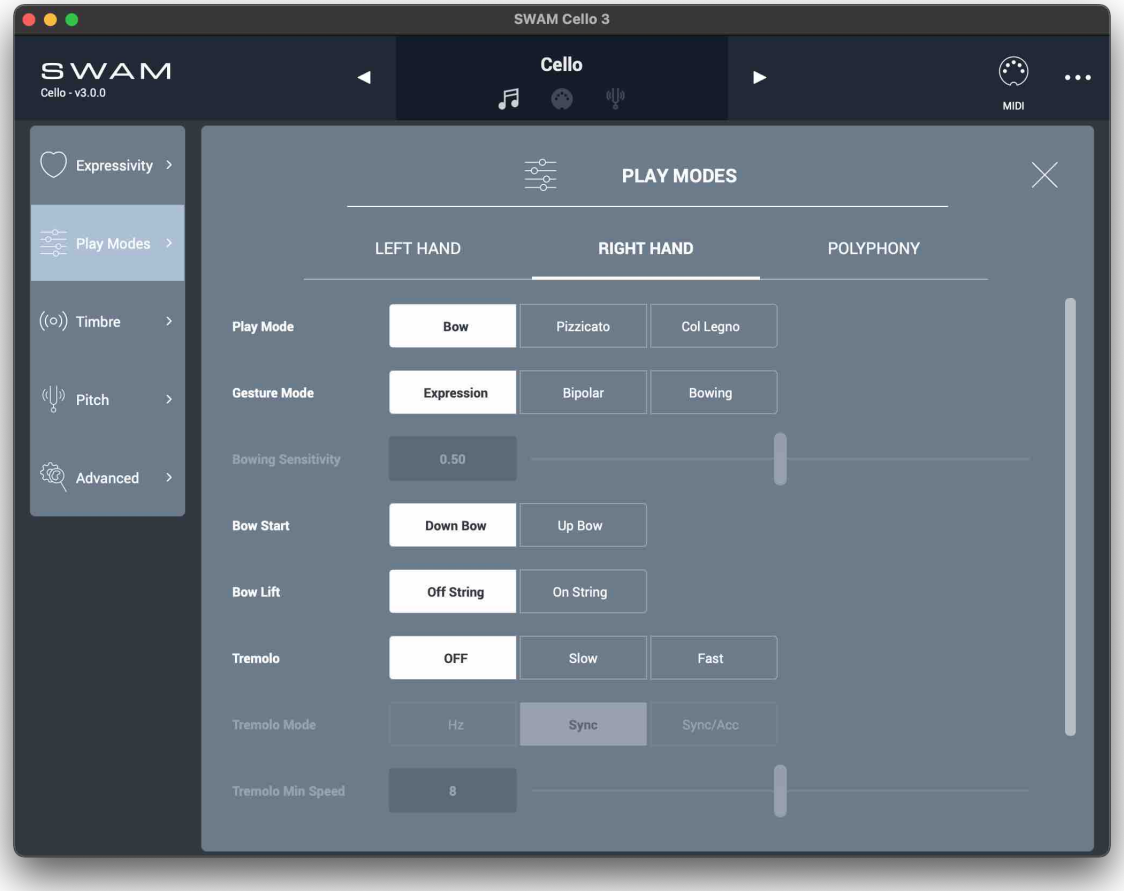


- Alternate Fingering
  [mapped to Key Switch D#]
  selects the default position of the left hand on the fingerboard. Note: in order to obtain a portamento on the same string, it is required to check and eventually set the proper AltFing position of the starting note (BEFORE pressing the starting note) and of the ending note (BEFORE pressing the ending note).
  - Mid: left-hand stays in the middle of the neck.
  - Bridge: left-hand stays towards the bridge (high position).
  - Nut+Open: left-hand stays near the nut (it is possible to play open strings). Vibrato is not possible on open strings.
- Harmonics
  [mapped to Key Switch F#]
  - OFF: no overtone.
  - 2: first overtone (one octave higher).

- 3: second overtone (one octave and a fifth higher).
- 4 Control: overtone selected by the "Harmonics 4 Control" parameter.

- Harmonics 4 Control *(locked on iPad)*
  Selects the overtone selected, when "Harmonics" is set to "4 Control"

Right Hand



- Play Mode:
  [mapped to Key Switch C]
  - Bow: the instrument is played using the bow
  - Pizzicato: the instrument is played plucking the strings using the fingers
  - Col Legno: the instrument is played striking the strings with the bow
- Gesture Mode: select the way the Expression is executed for PlayMode = Bow. [mapped to Key Switch D]
  - Expression: expression is mainly interpreted as the speed of the bow in relation to the bow pressure. If the Expression MIDI CC Min Value is set to 0 (zero) in the MIDI Mapping Curve page, bow change automatically occurs when expression is set to zero for a while. Otherwise, if the Expression MIDI

CC Min Value is set to a value different from zero in the MIDI Mapping Curve page, Auto-bow-change never occurs.

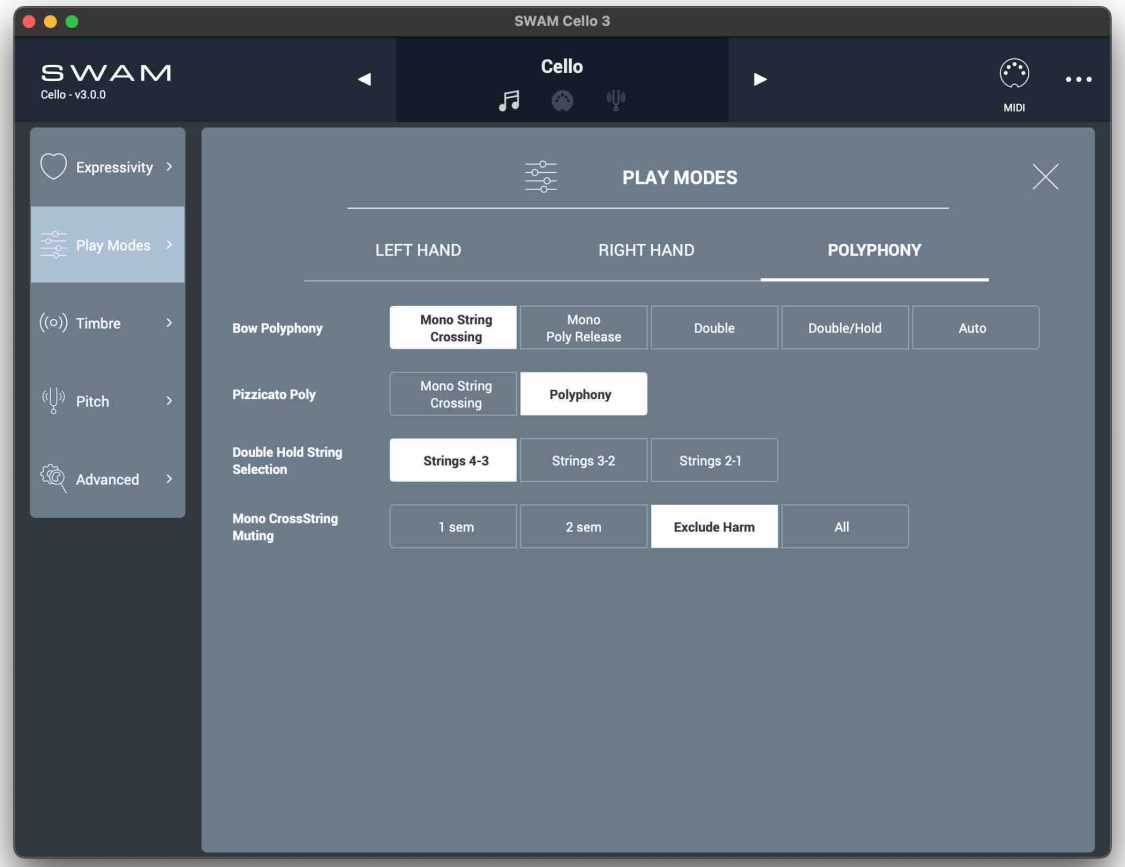
- Bipolar: expression is interpreted as the speed of the bow in a bipolar way; zero speed coincides with CC value = 63. Values below 63 are interpreted as down-bow, while values over 63 are interpreted as up-bow.
  In order to use this gesture, the MIDI mapping curve for Expression must be set to "Bipolar" as well. A warning message is displayed otherwise. See "Controller Mapping" section for more details.
  Note: this gesture is not suitable for Breath and Wind Controllers. It is intended for pedals, wheels, ribbons, X-Y pads and similar.
- Bowing: expression is interpreted as the displacement of the bow, the speed is proportional to the speed of the controller change. See also the "Bowing Sensitivity" parameter. Note: this gesture is not suitable for Breath and Wind Controllers. It is intended for pedals, wheels, ribbons, X-Y pads and similar.

- Bowing Sensitivity: when "Gesture Mode" is set to Bowing, this parameter controls how sensitive the bow speed is to the Expression changes.
- Bow Start:
  [mapped to Key Switch F]
  direction of the bow for staccato notes
  - Down Bow
  - Up Bow
- Bow Lift:
  [mapped to Key Switch E]
  Selects the starting/ending state of the bow. Note: the "Bow Lift" parameter acts mainly on the release, stopping the vibration of the string when it is set to "On String". It also acts slightly on the attack, but if you want to obtain a scratchy sound you should act on the velocity and on the bow pressure.
  - Off String: lift the bow away from the strings during release
  - On String: leaves the bow on the string during release
- Tremolo:
  [mapped to Key Switch G#]
  - Off: no tremolo.
  - Slow: slow tremolo.
  - Fast: fast tremolo (1.5 x slow tremolo rate).

  Tremolo speed and behavior are controlled by the "Tremolo Min Speed" and "Tremolo Mode" parameters on the Play Modes / Right Hand section. A "manual" tremolo is possible using the Key Switch C# ("Manual Bowing: KeySwitch" parameter set to "Tremolo") or by holding Sustain ("Manual Bowing: Sustain+Note" set to "Tremolo").
- Tremolo Mode: selects the tremolo rate behavior, affected by "Tremolo Min Speed" value:
  [mapped to Key Switch A]

    - Hz: the tremolo rate is not synchronized with the current project BPM. Rate is exactly equal to "Tremolo Min Speed" for "Slow" tremolo, or 1.5 times for "Fast" tremolo.
    - Sync: the tremolo rate is synchronized with the current project BPM, using a rate value that is just above "Tremolo Min Speed". Custom accents can be performed acting on the expression (expression "spikes" on the desired strokes).
    - Sync/Acc: the tremolo rate is synchronized with the current project BPM, using a rate value that is just above "Tremolo Min Speed"; an accent is performed every four or three strokes, depending on the selected note length (plain vs triplets).
- Tremolo Min Speed: speed of the tremolo for the "Slow" option (see the Tremolo multi-state button and KeySwitch). If the "Tremolo Mode" is set to "Hz", this value coincides with the "Slow" tremolo rate; the "Fast" tremolo rate is 1.5 times the "Slow" one. If the "Tremolo Mode" is set to "Sync" or "Sync/Acc", this value is a threshold: the tremolo is synchronized with current project BPM selecting a rate just greater than the threshold. The actual value of the tremolo rate is expressed as note length (e.g. 1/8 means quavers, 1/8T means quaver triplets, 1/16 means semiquavers, 1/16T means semiquaver triplets, and so on). The "Fast" rate is just the shorter note length just below the "Slow" selected value (e.g. if "Slow" corresponds to 1/8T, "Fast" is 1/16).
- Manual Bowing KeySwitch: sets the behavior for the C# Key Switch:
    - Tremolo: C# K.S. is set to "Manual Tremolo"; a bow change is performed on both Note-on and Note-off; the velocity of the Key Switch is ignored.
    - Bow Change: C# K.S. is set to "Bow Change", a bow change is performed just on Note-on; the velocity of the Key Switch influences the accent of the bow stroke.
- Manual Bowing Sustain+Note: sets the behavior of the Note-on / Note-off of the currently played note, when Sustain is active:
    - Tremolo: a bow change is performed on both Note-on and Note-off
    - Bow Change: a bow change is performed just on Note-on.

Polyphony

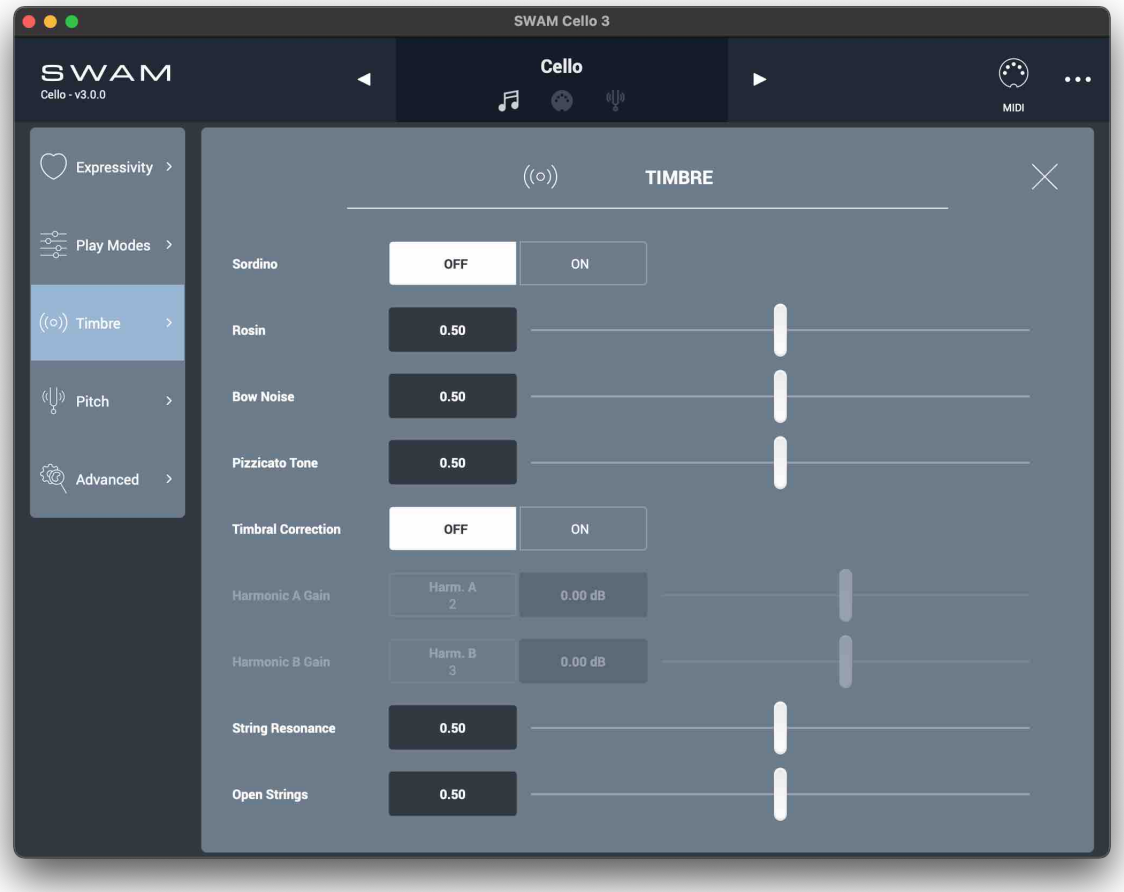


- Bow Polyphony (if Play Mode = Bow)
  [mapped to Key Switches B+C, B+C#, B+D, B+D#, B+E]
  - Mono String Crossing [B+C]: the instrument is monophonic; legato/portamento is achieved by overlapping two notes. If the legato/portamento involves two adjacent strings, the release of the previous note is stopped in order to avoid a "bichord" during the transition, depending on the interval set with the "Mono CrossString Muting" option (see Play Modes page).
  - Mono Poly Release [B+C#]: the instrument is monophonic; legato/portamento is achieved by overlapping two notes. If the legato/portamento involves two adjacent strings, the release of the first note is not stopped during the legato transition.
  - Double [B+D]: two simultaneous notes can be performed; legato and portamento is not possible if playing overlapping notes. The two selected notes are always on adjacent strings. Priority: last pressed note.

    - Double/Hold [B+D#]: two simultaneous notes can be performed; legato and portamento is possible. The two selected notes are always on adjacent strings. Priority: oldest note. The preferred pair of strings is selected using "Double Hold String Selection".
    - Auto [B+E]: two simultaneous initial notes can be performed; the first single note played turns the polyphony to Mono. Legato and portamento are also possible for two simultaneous notes. An additional latency is added at the attack in order to detect the double/mono mode. It is possible to change the detection time acting on the "Auto Poly Detection Time" parameter in the Advanced section.
- Pizzicato Poly (if Play Mode = Pizzicato or Col Legno)
    - Mono String Crossing: the instrument is monophonic; legato/portamento is achieved by overlapping two notes. If the legato/portamento involves two adjacent strings, the release of the previous note is stopped in order to avoid a "bichord" during the transition, depending on the interval set with the "Mono CrossString Muting" option (see Play Modes page).
    - Polyphony: it's possible to play multiple notes if they are distributed across different strings.
- Double Hold String Selection: sets the preferred pair of strings for double stops [mapped to Key Switches B+F#, B+G#, B+A#]
    - Strings 4-3: lowest strings (Key Switches B+F#)
    - Strings 3-2: middle strings (Key Switches B+G#)
    - Strings 2-1: higher strings (Key Switches B+A#)
- Mono CrossString Muting: affects the transitions across adjacent strings when the "Bow Polyphony" parameter is set to "Mono String Crossing". The release of the "old" string gets stopped if the interval performed between the first and the second note is included in the interval specified by the option:
    - 1 sem: 1 semitone (minor 2nd) for the first option
    - 2 sem: 1 or 2 semitones (minor 2nd and major 2nd) for the second option
    - Exclude Harm: 1, 2, 3, 4, 6, 8, 9, 11, 13 semitones (minor and major 2nd, minor and major 3rd, tritone, minor and major 6th, major 7th, minor 9th) for the third option
    - All: always for the fourth option

  For all the remaining intervals the "old" string is left free to vibrate, creating two overlapping tones during the transition.

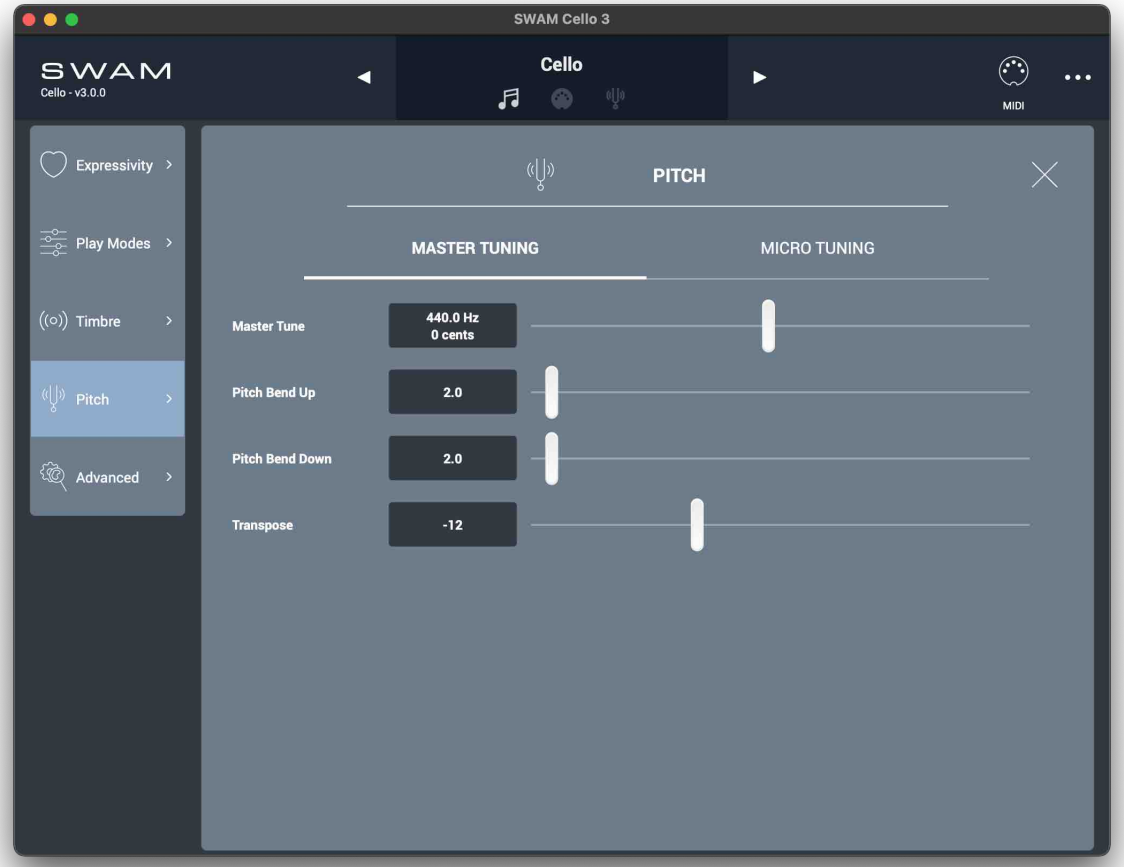
Timbre



- Sordino:
  - OFF: no mute applied
  - ON: a sordino is applied to obtain a muted sound
- Rosin *(locked on iPad)*: amount of rosin, affects the stickiness between the bow and the string.
- Bow Noise: amount of noise produced by the bow rubbing the string.
- Pizzicato Tone: color of the pizzicato pluck.
- Timbral Correction: enables or disables the Harmonics Timbral Shaping.
  ○ Harmonic A Gain: the gain amount for harmonic selected by "Harm. A"
  ○ Harmonic B Gain *(locked on iPad)*: the gain amount for harmonic selected by "Harm. B"
- String Resonance: resonance amount of the string. It affects the release time, open strings vibration and, partially, the timbre.
- Open Strings: amount of sympathetic effect (resonance) produced by open strings.

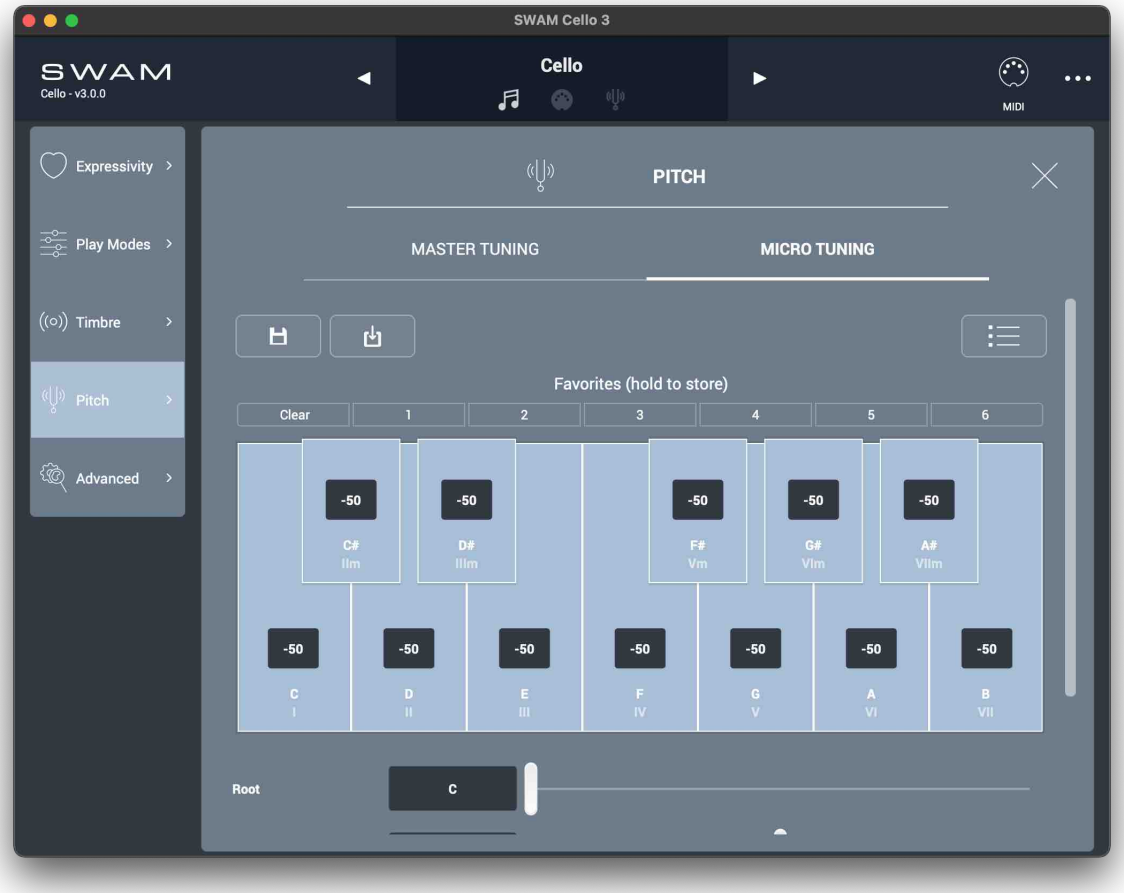
Pitch

Master Tuning



- Master Tune (Hz): master tuning of the instrument.
- Pitch Bend Up: the maximum amount of upwards pitch bend, in semitones.
- Pitch Bend Down: the maximum amount of downwards pitch-bend, in semitones.
- Transpose: the amount to transpose the instrument, in semitones

Microtuning



- Save icon  : save the current Microtuning settings as User preset
- Import icon  : import a Microtuning preset as User preset
- Preset list icon  : open the list of Microtuning presets. User presets are listed after the Factory presets
- Favorites: it's possible to store up to 7 different settings. Click and hold the preset slot to store the current configuration; click on any preset slotto recall the preset. Click on the **Clear** button to reset the current configuration to the default state
- Microtuning Keys:
    - Activation: Click on any key to toggle the detune, by the amount shown on the button.

    - Edit: Click on the detune value to adjust. The value is presented in cents (hundredths of a semitone)
- Root: select the root note of Microtuning scale
- Temperament: if set higher than zero, this applies a kind of "spread intonation":
    - it does not affect the pitch in the middle of the instrument
    - the higher the pitch, the more upward detuning is applied
    - the lower the pitch, the more downward detuning is applied

  This means that the overall intonation of the instrument can be "spaced apart".

  If set lower than zero, it does the opposite: it applies a kind of "compressed intonation"
- MAQAM (by Mazeka Toys - mazekatoys.com):
    - OFF: remove the factory MIDI MAQAM configuration
    - ON: apply MAQAM factory mapping (note: all mappings to parameters assigned to CC from 102 to 114 will be removed). This allows the use of a MAQAM remote controller to apply Microtuning and Transposition on the fly. Note: be sure MAQAM is connected properly through a MIDI interface so that MIDI events can reach the SWAM application or plug-in.
- MAQAM Transpose:
    - Note: control keyboard transpose
    - Root: control micro tuning transpose

Applying microtuning through SysEx

It's possible to control Microtuning through MIDI SysEx messages. SWAM responds to two protocols: Custom protocol and Yamaha PSR A3000 arranger protocol.

Custom Protocol

This protocol allows to change both Microtuning and Transposition on the fly through SysEx messages.

1) Microtuning message

Each message is 4 bytes:

```
1st byte: Beginning of the sysex (F0)
2nd byte: Note value (00=C, 02=C#, 04=D, ..., 12=A, 14=A#, 16=B)
3rd byte: Detuning value (00 = 0, 4E = -50)
4th byte: end of sysex (F7)

F0 10 10 F7: reset all notes to not detuned
```

Examples:

```
F0 00 4E F7: Note C = -50 cents
F0 10 4E F7: Note G# = -50 cents
F0 16 00 F7: Note B = 0 cents
```

2) Transpose message

Each message is 3 bytes:

```
1st byte = Beginning of sysex (F0)
2nd byte = Transpose value (37=-9, 38=-8, 39=-7, 3A=-6 ... 40=0 ... 48=+8, 49=+9)
3rd byte = End of sysex (F7)

F0 10 F7: reset transpose to 0
```

Yamaha PSR A3000 arranger protocol

Each message is 9 bytes:

```
1st byte: Beginning of SysEx message (F0)
2nd byte: Manufacturer ID - Yamaha (43)
3rd byte: Device ID
4th byte: Model ID - PSR A3000 (4C)
5th byte: Address High (08)
6th byte: Address Mid (00)
7th byte: Address Low - Note value (41=C, 42=C#, 43=D, ..., 4C = B)
8th byte: Detuning value (04=-60, 05=-59, 06=-58, ..., 40=0, ..., 7B=+59, 7C=+60)
9th byte: End of SysEx message (F7)
```

Examples:

```
F0 43 10 4C 08 00 41 5E F7: Note C = +30 cents
F0 43 10 4C 08 00 41 18 F7: Note C = -40 cents
F0 43 10 4C 08 00 4A 0E F7: Note A = -50 cents
```

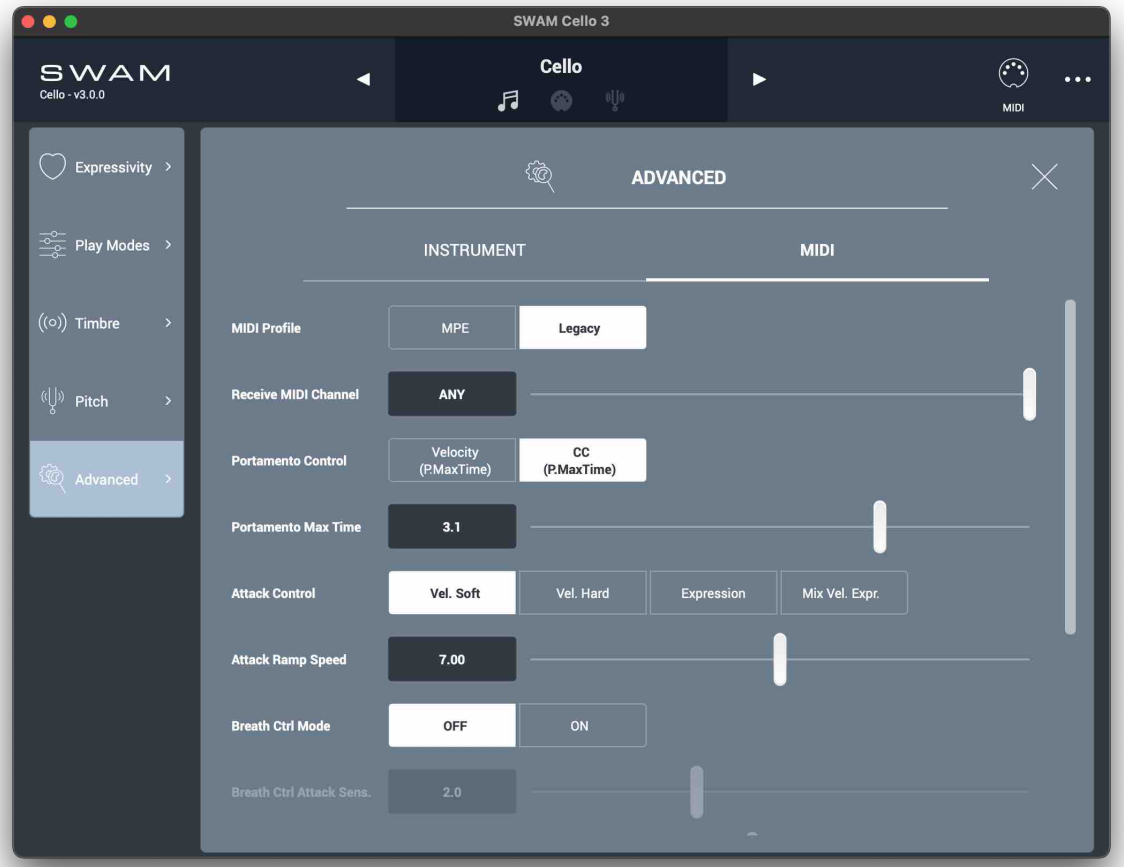
Advanced

Instrument

- Instrument: selects different instrument bodies with different timbres and characters.
- PortamSplit Ratio *(locked on iPad)*: sets the split point (percentage of the interval) for a portamento across two strings. For example, 20 means 20% on the starting string and 80% on the other string.
- Vibrato Rate Rand *(locked on iPad)*: controls how much randomness is applied to the rate of vibrato.
- Vibrato Fade In *(locked on iPad)*: how long (in milliseconds) it takes for the vibrato to reach the final amount after each note-on.
- Random Bow Amount *(locked on iPad)*: amount of randomness of the bow pressure, speed and position.
- Random Finger *(locked on iPad)*: amount of randomness of the left-hand finger position (pitch).
- Dynamic Transitions *(locked on iPad)*: controls the shape of the expression during legato transitions.

- String Model
    - Real (Alternate Fingering): the model emulates a real instrument with four strings with fixed thickness and tension.
    - Virtual Adaptive Resizing (Mono): the model emulates an instrument with just a single string that ideally has different thickness and tension, depending on the actual played note. This way is possible to bend up from the lowest note to the highest one with no jumps: set Pitch Bend range to 48 semitones, play the lowest note, and move the Pitch Bend all the way up.
      Since the instrument has just one string, polyphony is not possible (all parameters related to "Polyphony" are disabled).
- Panpot Type *(locked on iPad)*
    - Dyn1, Dyn2 - emulates small movements of the player.
    - Acoustic - adjusts the position of the instrument in the sound field, but does not affect the reverb.
    - Balance - affects both the instrument and the reverb.
- Interactive Bow Compensation *(locked on iPad)*: controls the amount of correction of the bow pressure to maintain a good vibrating sound.
- Pizzicato Fingerboard Interference *(locked on iPad)*: controls the amount of interference between the string and the fingerboard during pizzicato.
- Auto Poly Detection Time: sets the look-ahead time for the detection of bichords when polyphony is set to "Auto". The detection of bichords only happens for staccato notes. Note: an extra-latency is added to staccato notes when polyphony is set to "Auto", so it is better to set it to the smallest possible value.
- Advanced Legato *(locked on iPad)*
  Legato is modeled with a sophisticated model that mimic the real behavior of
    - OFF: legato is modeled with a fast sweep transition.
    - From 4th: advanced legato starts from perfect 4th interval (5 semitones)
    - From 5th: advanced legato starts from perfect 5th interval (7 semitones)
- String Tuning, Strings 3-4 Interval *(locked on iPad)*, Strings 2-3 Interval *(locked on iPad)*, Strings 1-2 Interval *(locked on iPad)*: tuning of the lowest string followed by the tuning of the other strings. As in the real instrument, the tuning of the other strings can be set only a fourth or a fifth higher than the adjacent lower string.

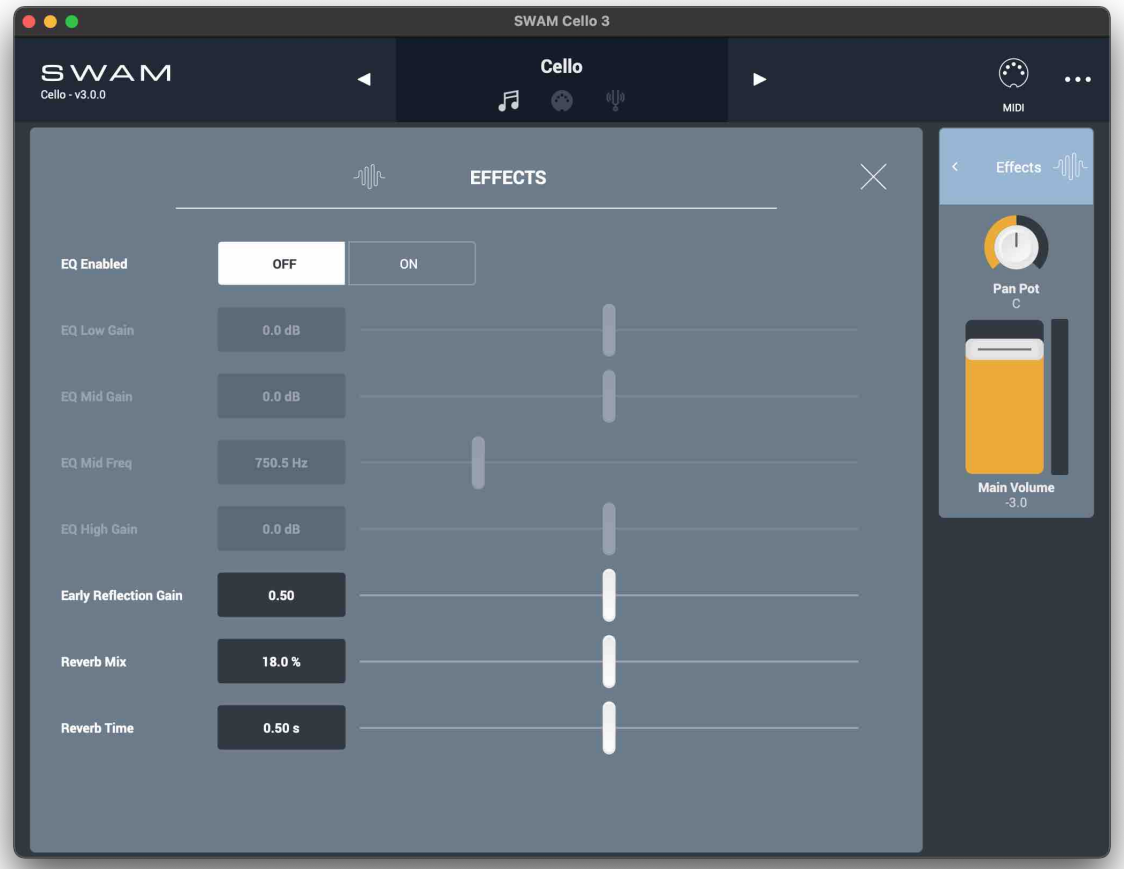
MIDI



- MIDI Profile:
  - MPE: for MIDI Polyphonic Expression compatible devices.
  - Legacy: MIDI 1.0 devices.
- Receive MIDI Channel: is the MIDI channel the sound generator receives notes and controllers that affects the sound (default is ANY). Note that this can be different from Key Switches MIDI Channel, so it is possible to control Key Switches from a different device. For MPE Devices this is forced to ANY.
- Portamento Control:
  - Velocity: the portamento time is controlled by the note-on velocity of overlapping notes.
  - CC: the portamento time is controlled by a MIDI Continuous Control (such as Control Change, AfterTouch, NRPN)
- Portamento Max Time: controls the portamento time.
  Set it to OFF to disable portamento (no portamento when this value is < 1.1).

- Attack Control - how the attack of the note is controlled:
    - Vel. Soft - controlled weakly by the note-on velocity.
    - Vel. Hard - controlled strongly by the note-on velocity.
    - Expression - controlled by the shape of expression control.
    - Mix Vel. Expr. - controlled by both the velocity and the initial expression. See also "Attack Ramp Speed" for controlling the character of the attack.
- Attack Ramp Speed *(locked on iPad)*: steepness of the attacks, when controlled by Note-on Velocity.
- Breath Ctrl Mode (Breath Control Mode):
    - OFF: disabled.
    - ON: suitable for Breath Controllers. When Play Mode is set to Bow, allows the player to produce another note attack, using the breath envelope, while holding a note.
- Breath Ctrl Hi-Res Threshold: (Breath Control Hi-Resolution Threshold) set the threshold for the note-on to be triggered when using MIDI Hi-Resolution messages for the Expression parameter, when Breath Control Mode is ON.
- Breath Ctrl Attack Sens.: (Breath Control Attack Sensitivity) controls the sensitivity of the note-on attack strength for notes triggered in Breath Control Mode.
- KS MIDI Channel (Key Switches MIDI Channel): select which MIDI channel will be used to receive key switch information. Select from channel 1 to 16 or ANY.
- KS Octave (Key Switches Octave Transpose): allows you to transpose the Key Switches to begin in the octave from C-1 to C2, or turn off key switches (OFF).
- KS Velocity Remap (Key Switches Velocity Remapping): since some Key Switches are velocity-dependent, this parameter controls the distribution of the thresholds between states.

Effects

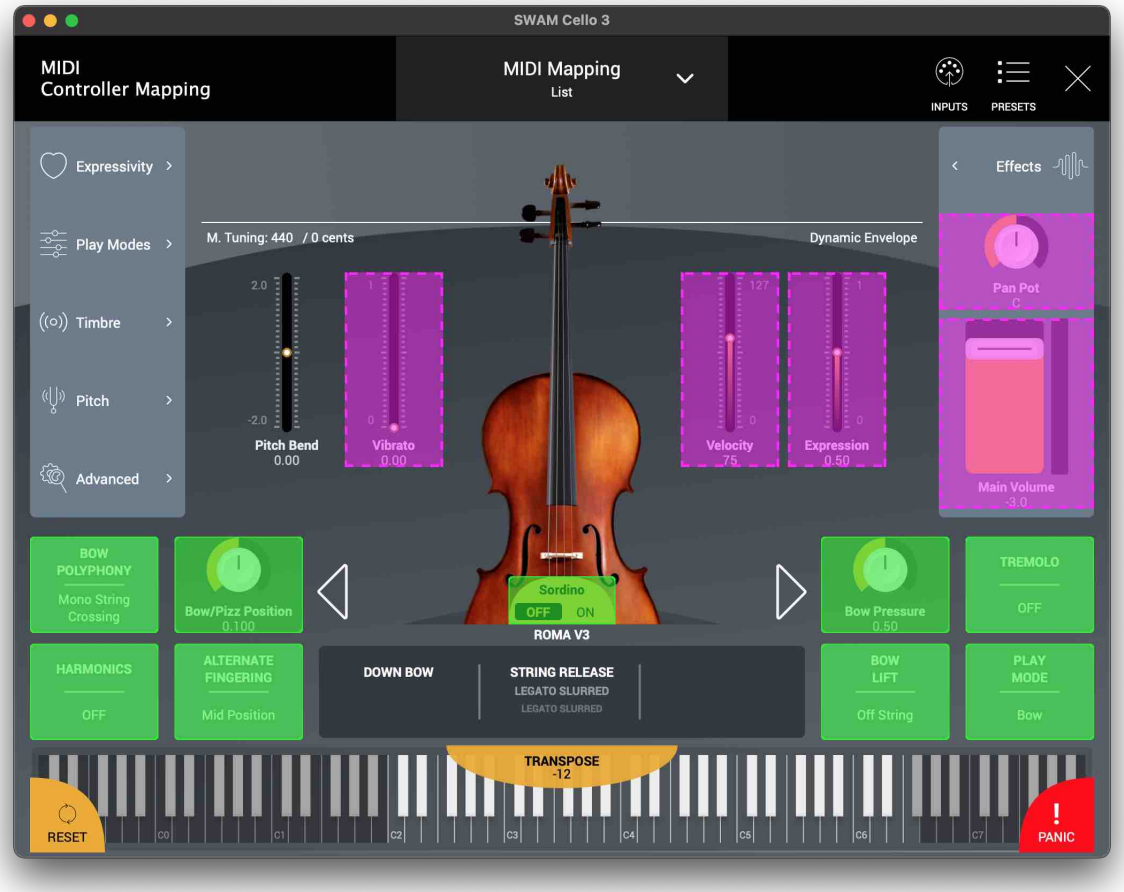


- EQ Enabled: enables or disables the Equalizer (see next).
- EQ Low Gain, EQ Mid Gain, EQ Mid Freq, EQ High Gain: Equalizer parameters. Note that ranges are different for each instrument. They have been calibrated for the harmonic contents of each instrument.
- Early Reflection Gain: amount of Early Reflections.
- Reverb Mix: controls the amount of reverb added to the dry signal.
- Reverb Time: controls how long the decay time of reverb tail is.

Controller Mapping

The MIDI Controller Mapping section allows the user to manage the mapping between an external MIDI controller and the instrument parameters.

To access this page, click on the MIDI mapping icon in the header 

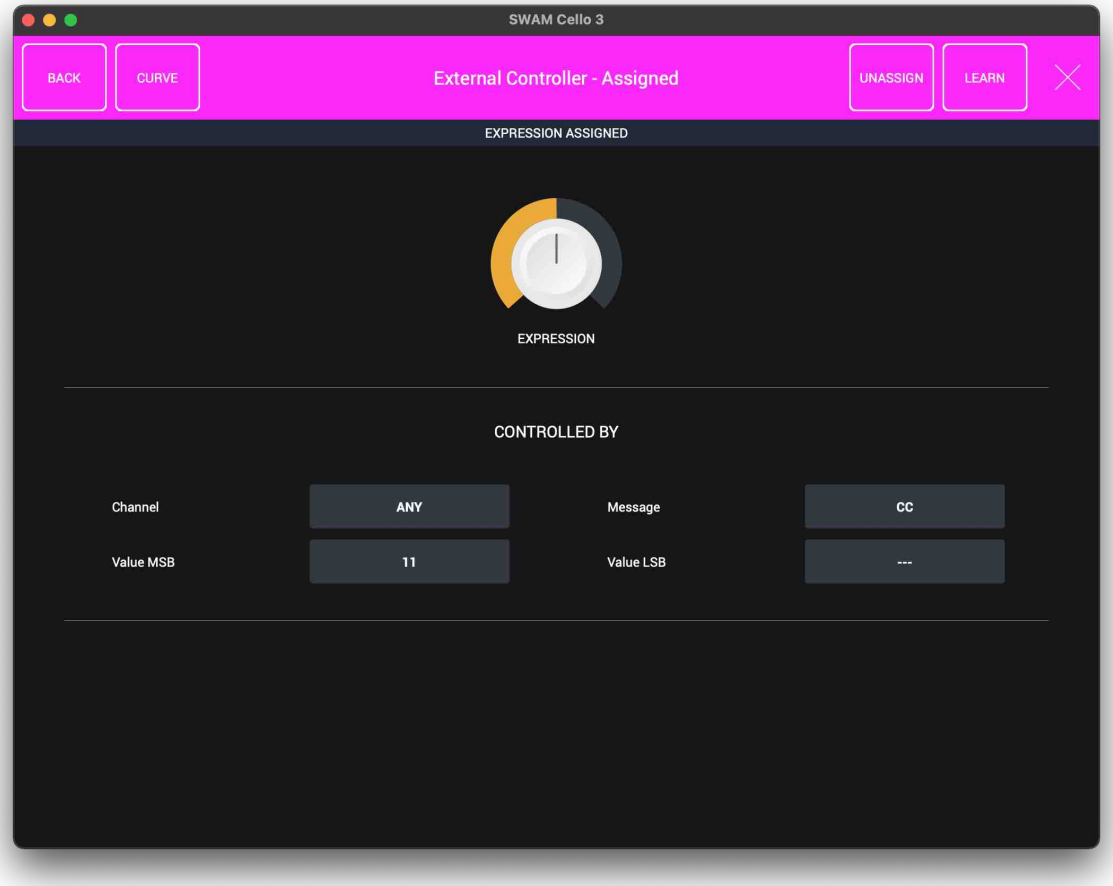


In this view/context, the parameters assigned to a controller are highlighted with a purple area with dashed borders; parameters which are not assigned are highlighted with a green area. Parameters not highlighted are not available for mapping. It is possible to browse the entire interface in this mode to select and manage any parameter for mapping.

- To map or edit a parameter mapping, click directly on the parameter to access the mapping screen for that parameter.
- Click on the "MIDI Mapping list" button in the top header to view the list of all parameters, their mapping status and to manage the sound engine parameters that have a direct effect on playability results with different controller types.
- Click on the "X" button in the top header to exit from Controller Mapping mode.

Mapping Screen

Assigned parameter status



- Back: goes back to the previous screen
- CURVE: show the MIDI remapping curve for the selected mapping
- UNASSIGN: removes the current mapping and goes back to MIDI Learn mode
- LEARN: turns ON/OFF the MIDI LEARN to edit or remap the current parameter
- X: close the mapping screen and turn off the MIDI Mapping Mode

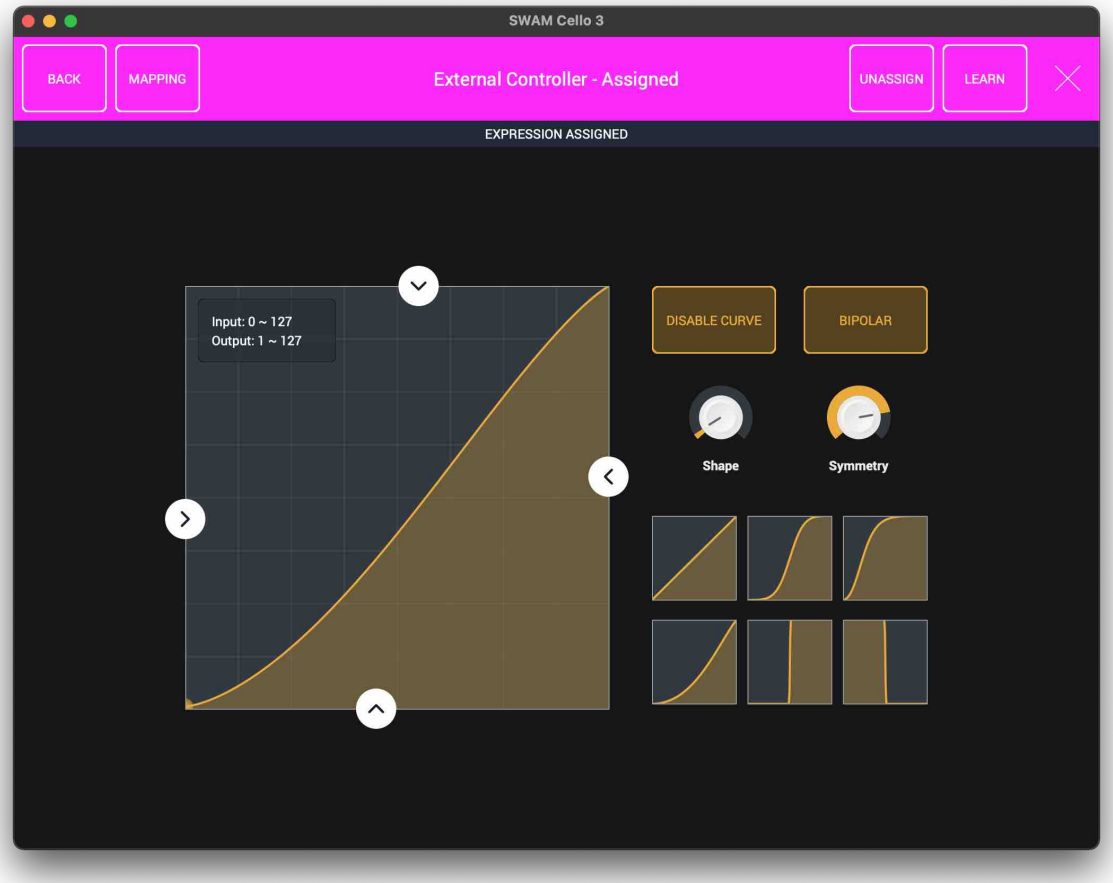
- Controlled By section:
  - Channel: change which MIDI channel this controller will be affected by, from 1 to 16, or ANY.
  - Message: MIDI message type:
    - CC: Control Change (1 byte value).
    - CC-HIRES: two coupled Control Change messages, MSB and LSB.
    - AT: Aftertouch (1 byte value).
    - NRPN: Non-Registered Parameter Number.
  - CC# MSB: available only for Message = CC, CC-HIRES, NRPN:
    - if Message = CC, MSB is the CC number.
    - if Message = CC-HIRES, MSB is the Most Significant Byte of the two-byte hi-resolution message, from CC0 to CC31.
    - if Message = NRPN, MSB is the Most Significant Byte of the two-byte NRPN message.
  - CC# LSB: available only for Message = CC-HIRES, NRPN:
    - if Message = CC-HIRES, LSB is the Least Significant Byte of the two-byte hi-resolution message, from CC32 to CC63.
    - if Message = NRPN, LSB is the Least Significant Byte of the two-byte NRPN message.

NOTE:

- *CC means "Control Change". It's a standard MIDI message used to control a wide variety of functions in a synthesizer or software instrument. The value of a CC is represented by a 7-bit byte, allowing a total of 128 values of resolution.*
- *AT means "Aftertouch". Some MIDI devices have the ability to sense the amount of pressure which is being applied to the keys or the touch surface while they are depressed. This pressure information, commonly called "Aftertouch", may be used to control some aspects of the sound produced by a synthesizer or software instrument. AT is a standard 7-bit MIDI message, allowing a total of 128 values of resolution.*
- *CC-HIRES messages are a combination of two CC messages coupled together, thus providing a resolution of 14-bit, i.e. 16384 levels, for the represente values.*
- *NRPN, i.e. "Non-Registered Parameter Number", extends the number of controllers available via MIDI. They are typically used to send parameter data to a synthesizer and software instruments in order to edit sound patches or other data, providing a resolution of 14-bit, i.e. 16384 levels, for the represente values.*
- *MSB means "Most Significant Byte". For CC and AT messages, it is the only byte representing the control value. For CC-HIRES and NRPN messages, it is the most significant part of the two-byte message.*
- *LSB means "Least Significant Byte" and is only for CC-HIRES and NRPN messages. It is the least significant part of the two-byte message.*

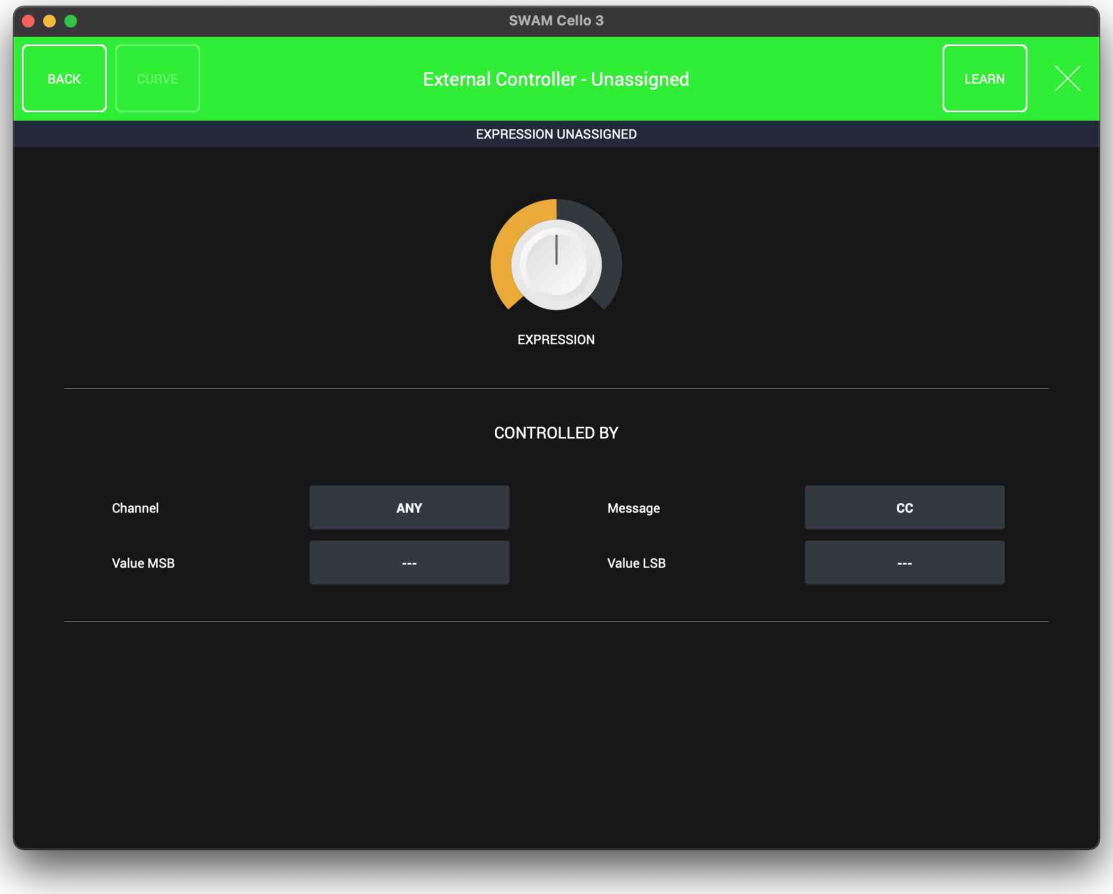
For more details on what CC, NRPN, MSB, LSB, please refer to MIDI specifications at https://midi.org

- CURVE : click on the button to show the mapping curve. The curve can be used to adjust the controller-to-parameter behaviour with:
    - Input Min (left arrow): the minimum threshold on the controller input value. Values below this value will produce the "Out Min" value (or the "Out Max" value, if the curve is "inverted").
    - Input Max (right arrow): the maximum threshold on the controller input value. Values above this value will produce the "Out Max" value (or the "Out Min" value, if the curve is "inverted").
    - Output Min (bottom arrow): the minimum output value.
    - Output Max (upper arrow): the maximum output value.
    - Shape: controls the shape of the remapping curve (be aware, small changes can produce high variations, depending on the Symmetry parameter).
    - Symmetry: controls the symmetry of the remapping curve.
    - DISABLE CURVE: bypass the remapping curve
    - BIPOLAR: useful for "bipolar" controls, i.e. where 64 is considered the "zero" of the controller. The parameter of the remapping curve are referred to just one side and the applied to the "negative", antisymmetric side



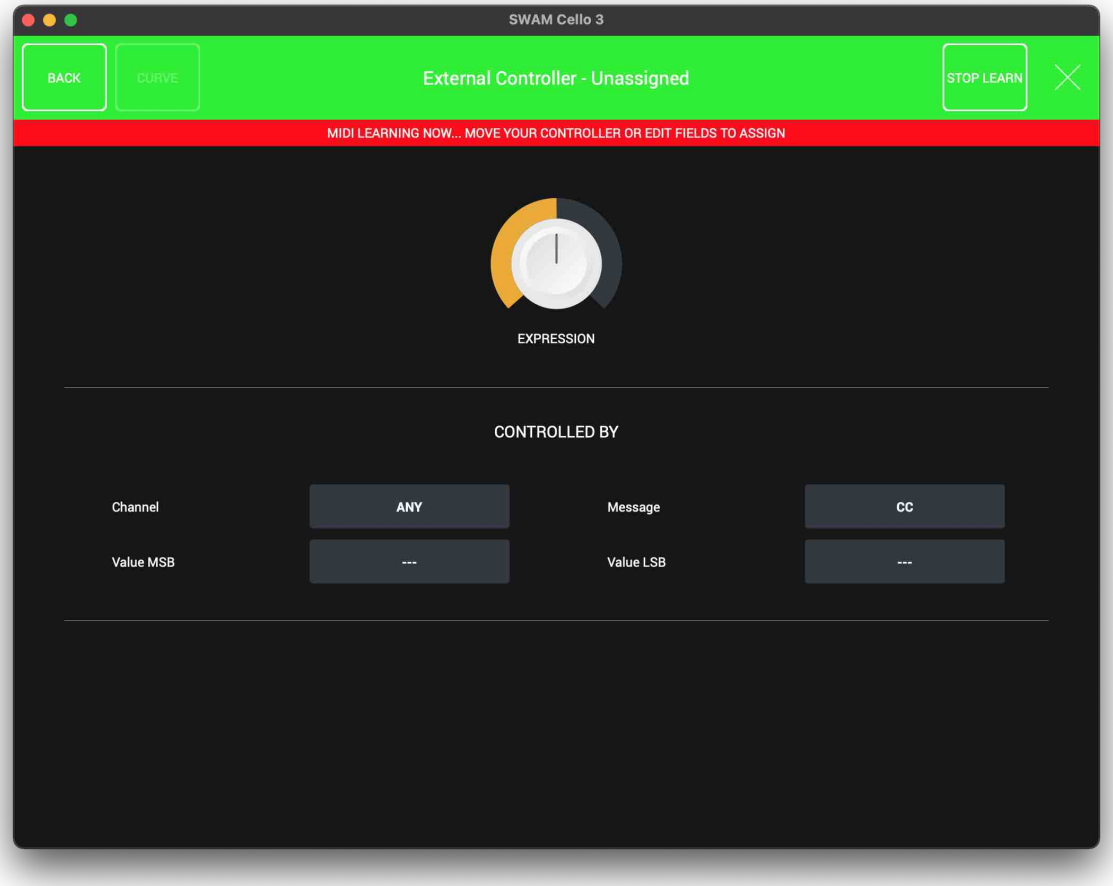
Unassigned parameter status

Any click on an unassigned parameter goes to this screen.



If "LEARN" is active, SWAM automatically listens for MIDI input messages while in LEARN MODE. Move the controller you want to connect to automatically complete the mapping.

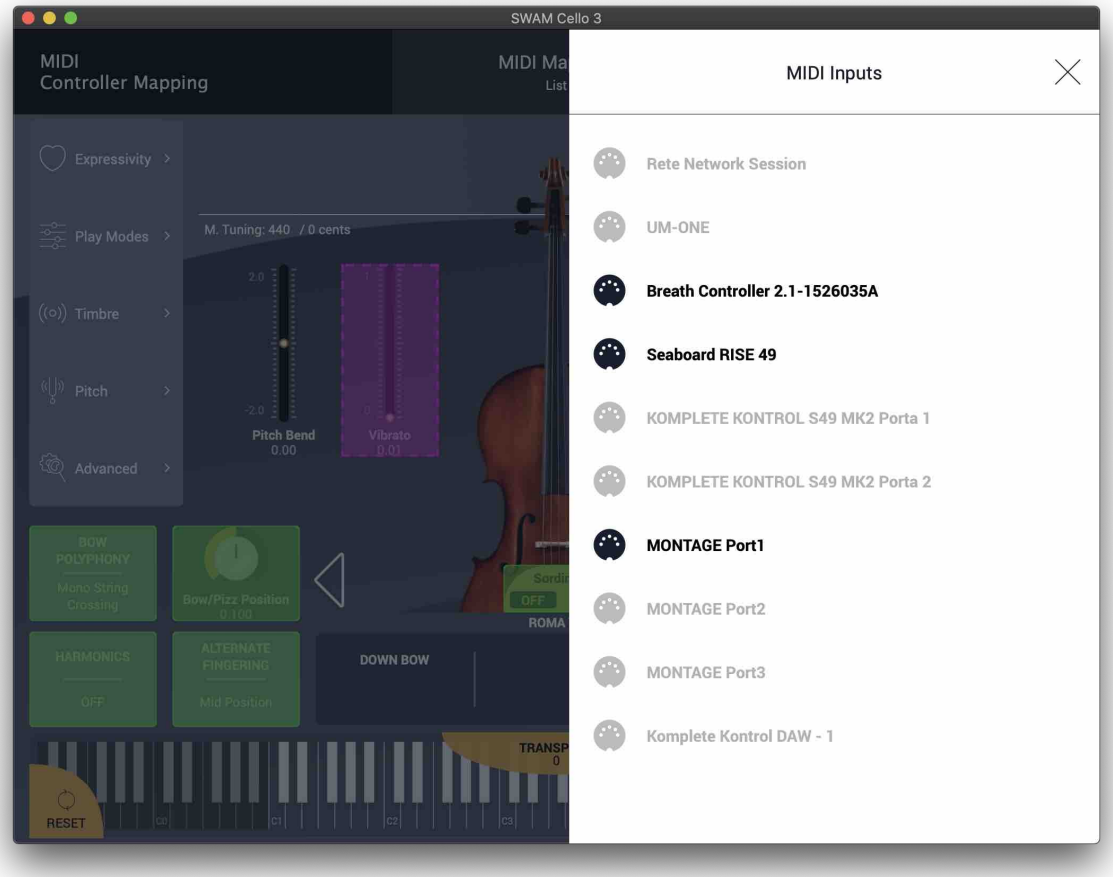
The area "Controlled by" will be automatically filled in by MIDI Learn but can still be edited by manual input as well.



MIDI Inputs quick access

For the Standalone version, a quick access to the MIDI input devices is available from the MIDI Mapping 

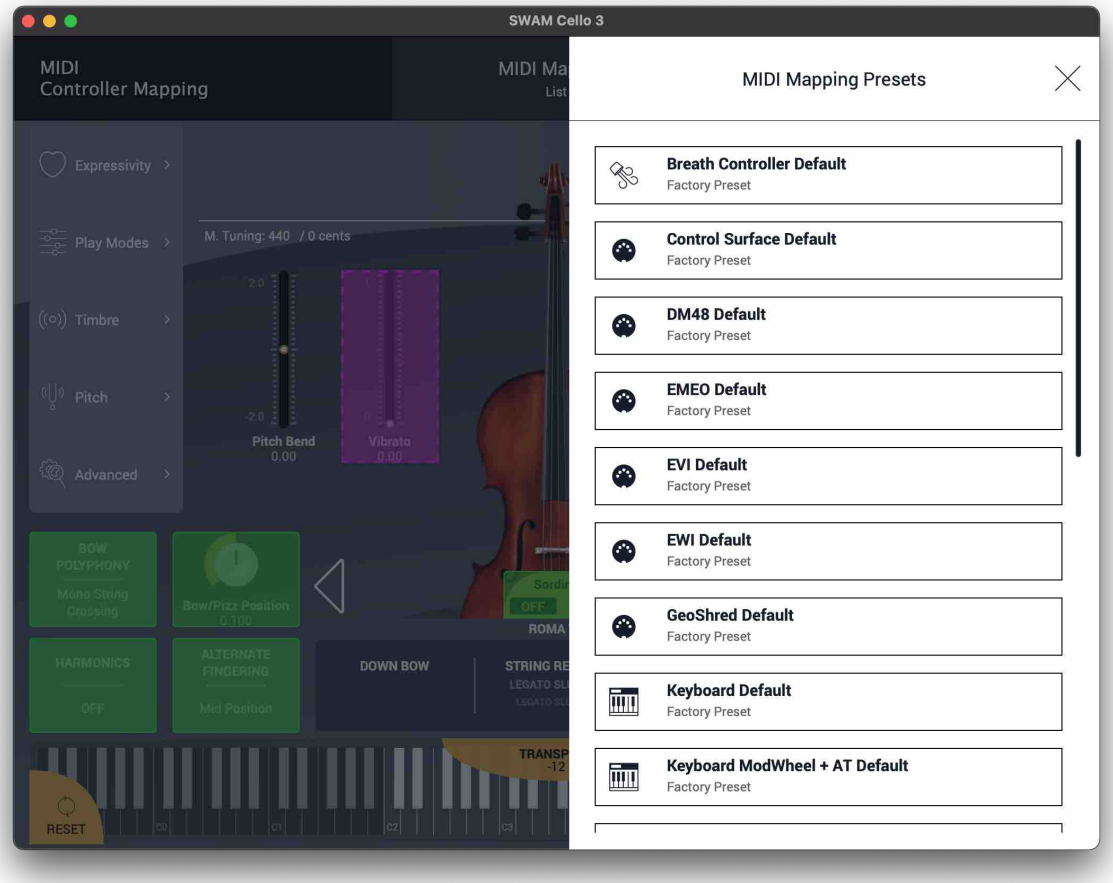
by clicking on the "INPUTS" icon 



MIDI Mapping Presets

It's possible to recall a predefined set of both pre-defined assignments for well known MIDI Controllers and User MIDI assignments through the PRESETS icon 

.



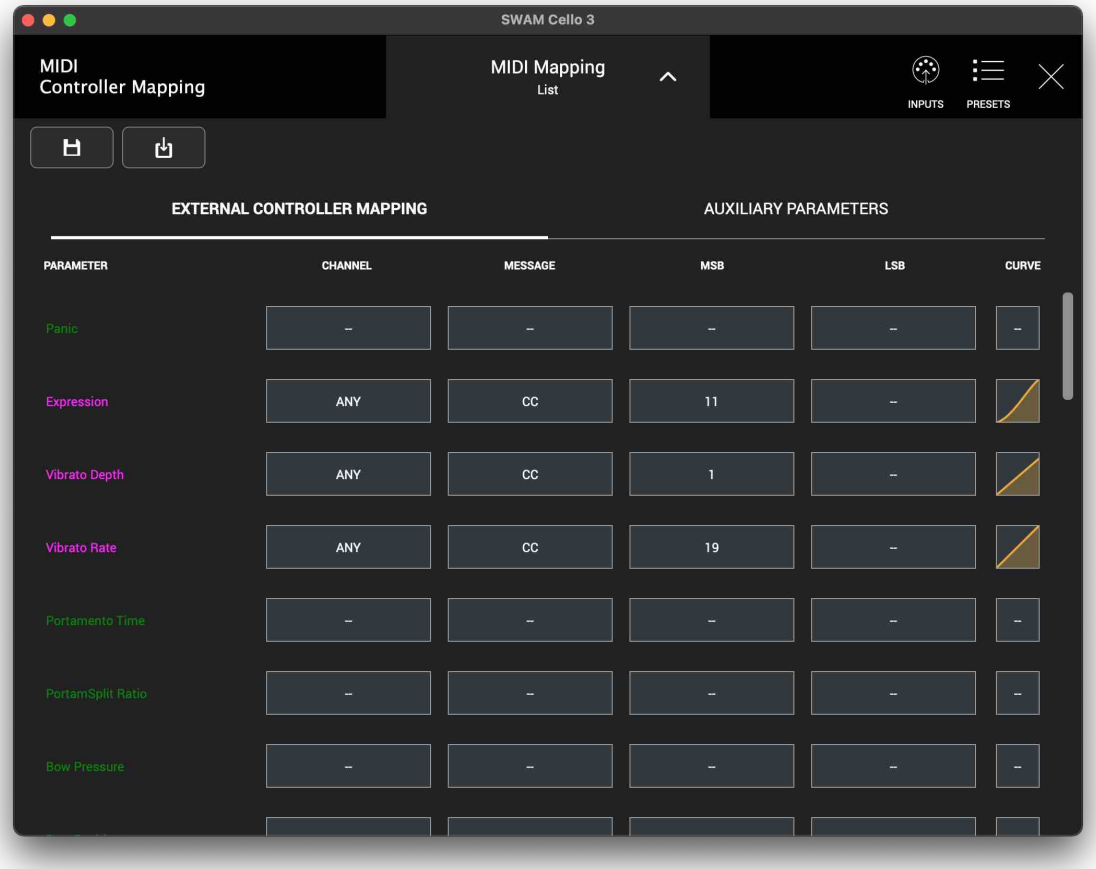
These entries allow us to recall predefined sets of assignments without impacting on the Sound parameters. This is useful when switching between different physical MIDI controllers without losing the timbre and sound behavior obtained acting on the Sound parameters.

MIDI Mapping List

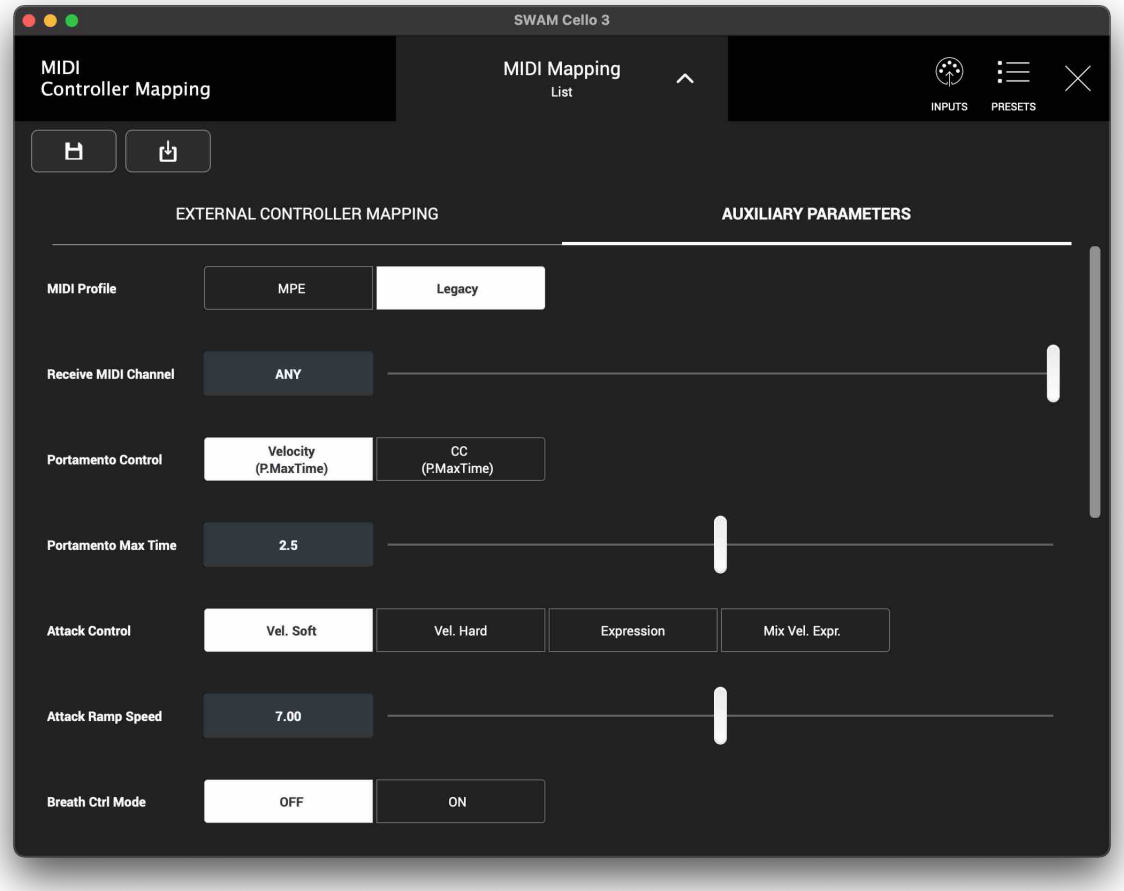
The "MIDI Mapping List" screen recaps all the mapping settings, providing the big picture of all mappings and the configuration of auxiliary parameters.

The screen is organized in two tabs:

- External Controller Mapping: this is the list of all the parameters that can be mapped individually by the process described above. Click on any row to create a new assignment, or to edit an existing assignment.

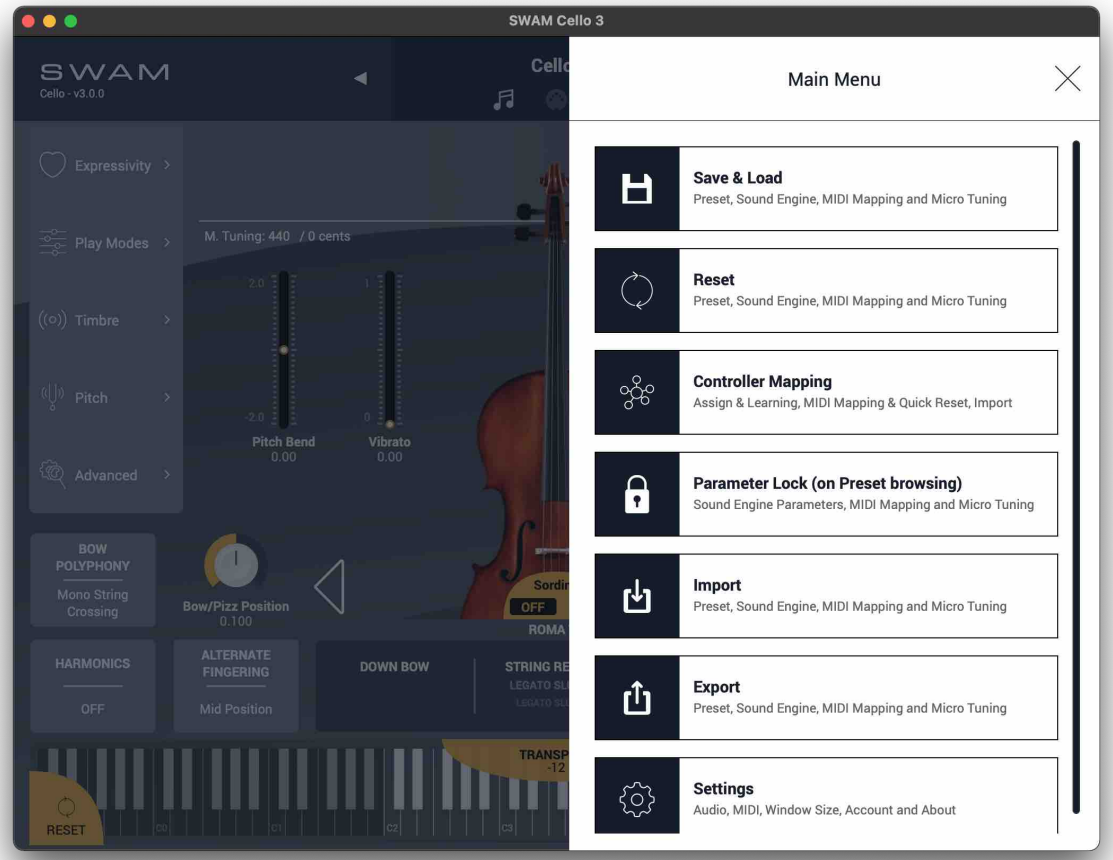


- Auxiliary Parameters: settings and parameters that have a key role in managing the sound engine's response to different controllers. Most of the entries can be found in the "Pitch" and the "Advanced | MIDI" sections as well. These parameters are saved along with the External Controller mapping entries to ensure consistent controller presets.



It's possible to save a custom "MIDI Mapping Preset" from the save button and import a custom "MIDI Mapping Preset" from load button . The imported preset will be listed on the MIDI Mapping Preset list (see MIDI Mapping Presets section for reference).

Main menu

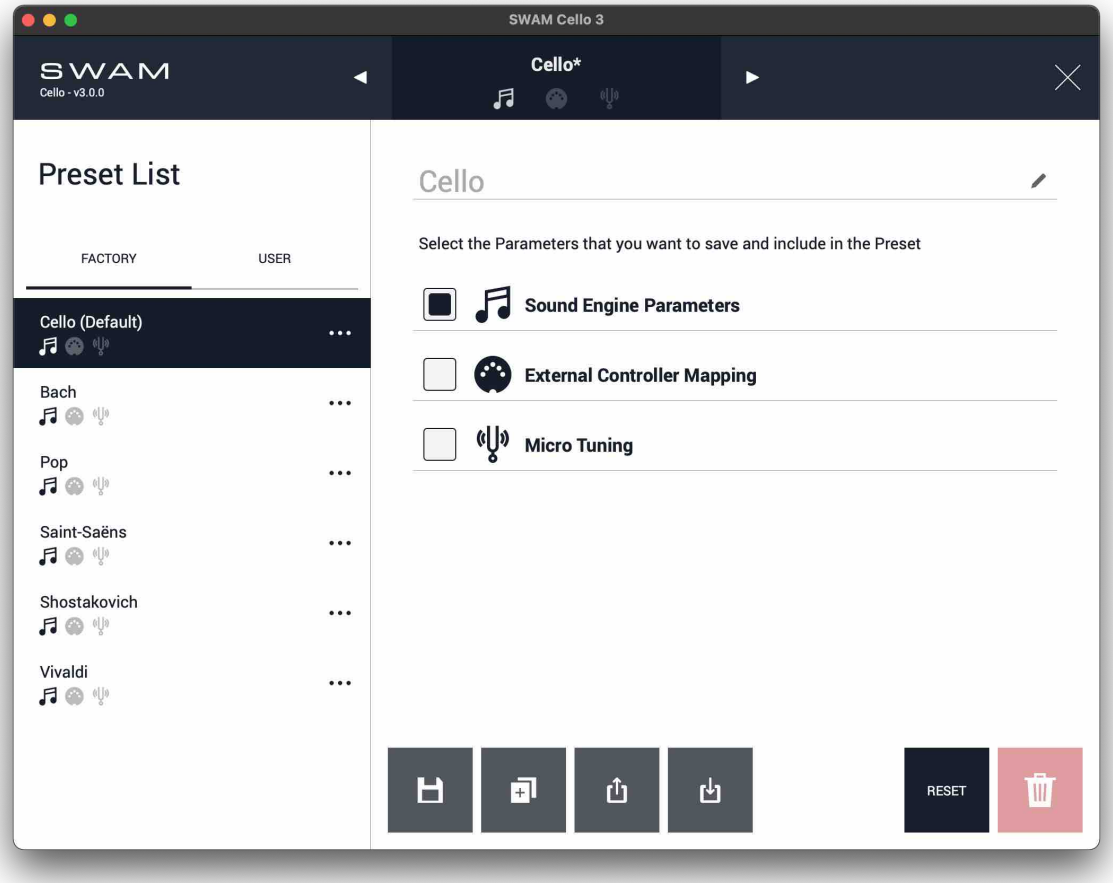


The Main Menu is available when clicking on the top-right  icon.

- Save & Load: open the Preset Management window.
- Reset:
    - Initialize: reset sound engine parameters
    - Advanced:
        - Reload “current preset”: reload the current selected preset, losing all changes made from the latest
        - Sound Engine: reset or load sound engine parameters
        - MIDI Mapping: reset or load MIDI mapping settings
        - Micro Tuning: reset or load micro tuning settings
- Controller Mapping:
    - Assign & Learn: open MIDI mapping management section
    - MIDI Mapping & Quick Reset: open MIDI parameters list & Quick Reset

    - Import: controller mapping from file
- Parameter Lock:
    - Sound Engine Parameters: freeze the sound when browsing your Presets
    - External Controller Mapping: keep the same MIDI Controller Mapping with different Presets
    - Micro Tuning Settings: keep the same micro tuning settings with different Presets
- Import:
    - Preset: load a .swam preset file
    - Sound Engine Parameters: load a .swamse preset file
    - MIDI Mapping: load a .swamec preset file.
    - Micro Tuning: load a .swammt preset file
- Export:
    - Preset: save the current instrument state as a .swam preset file
    - Sound Engine Parameters: save sound engine parameters as a .swamse preset file
    - MIDI Mapping: save external controller settings as a .swamec preset file
    - Micro Tuning: save micro tuning settings as a .swammt preset file
- Settings:
    - Audio: open the "Audio Setup" window (available for the Standalone App only).
    - MIDI: open the "MIDI Setup" window (available for the Standalone App only).
    - Window Size: show a small popup window that allows to set the GUI orientation and zoom factor.
    - Account & License: open the "Account & License" window.
    - About: open the "About" page, where it's possible to check the version and build number, access to the online resources and show the Credits

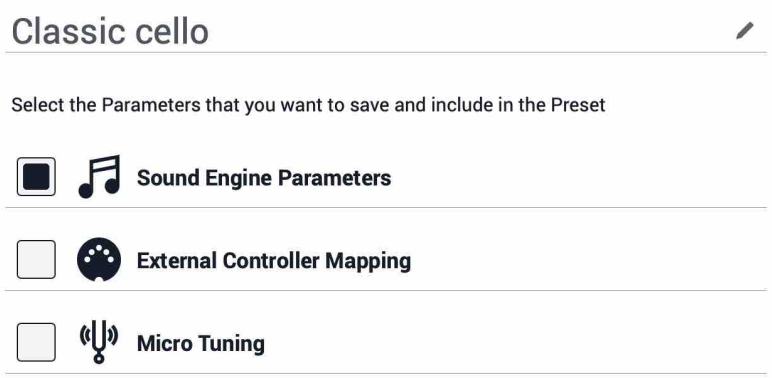
Preset Management



- Preset List: on the left hand side it is possible to select presets. SWAM presets are organized into two groups: Factory and User. User presets can be added, edited and deleted. Factory presets cannot be edited or deleted; any save action performed on a Factory preset generates a User preset.

Default startup Preset

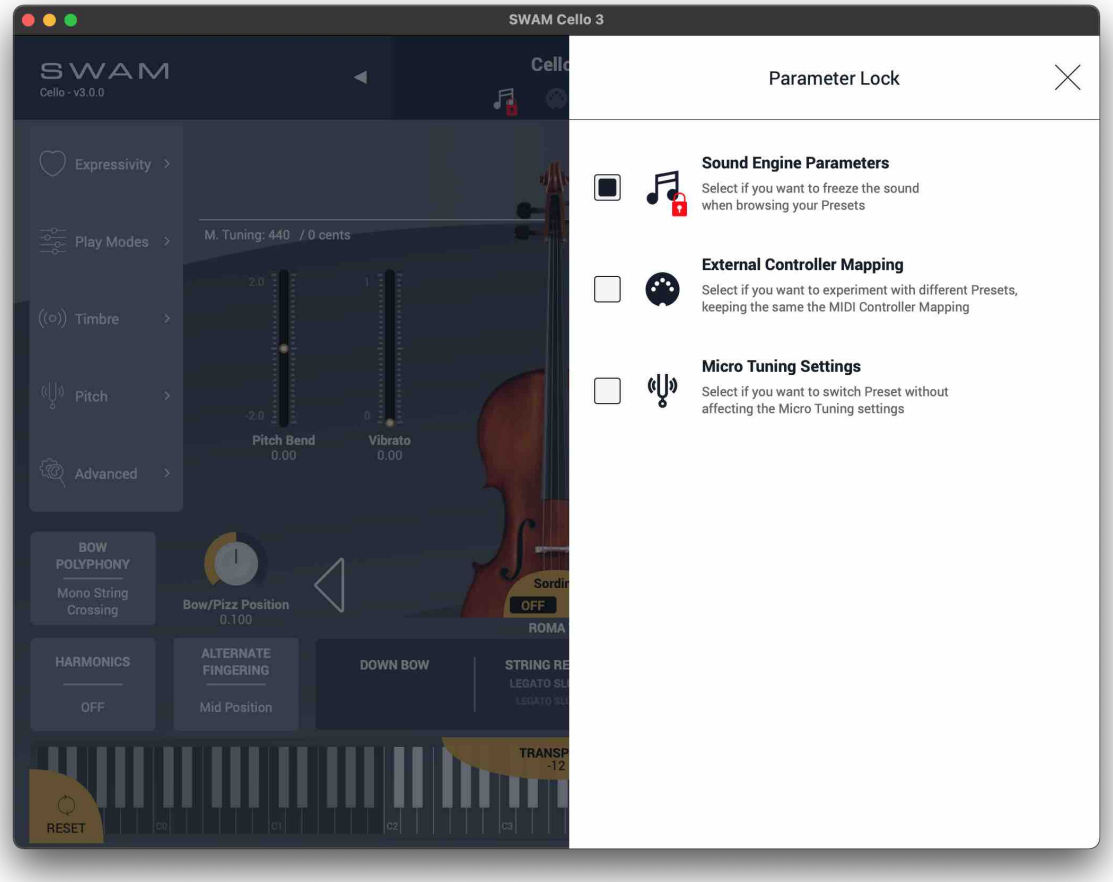
Any preset can be selected to become the "default" one, i.e. the one loaded at startup: click on [...] next to the preset name and choose "Set as default".



- Shows the preset components, such as Sound engine parameters, Controller Mapping and Micro Tuning settings. From this area, it's possible to choose the group of parameters that you want to include in the SWAM preset.

- Save: save current preset.
- Duplicate: duplicate current preset to create a new one.
- Export preset: open export options.
  NOTE: compatibility of preset exports with future releases is not guaranteed. It is strongly recommended that users archive custom presets in a custom folder at a different location to the default preset folder.
- Import preset: open import options.
- RESET: reset parameters to the default state.
- DELETE: delete the user-selected preset.

Parameter Lock



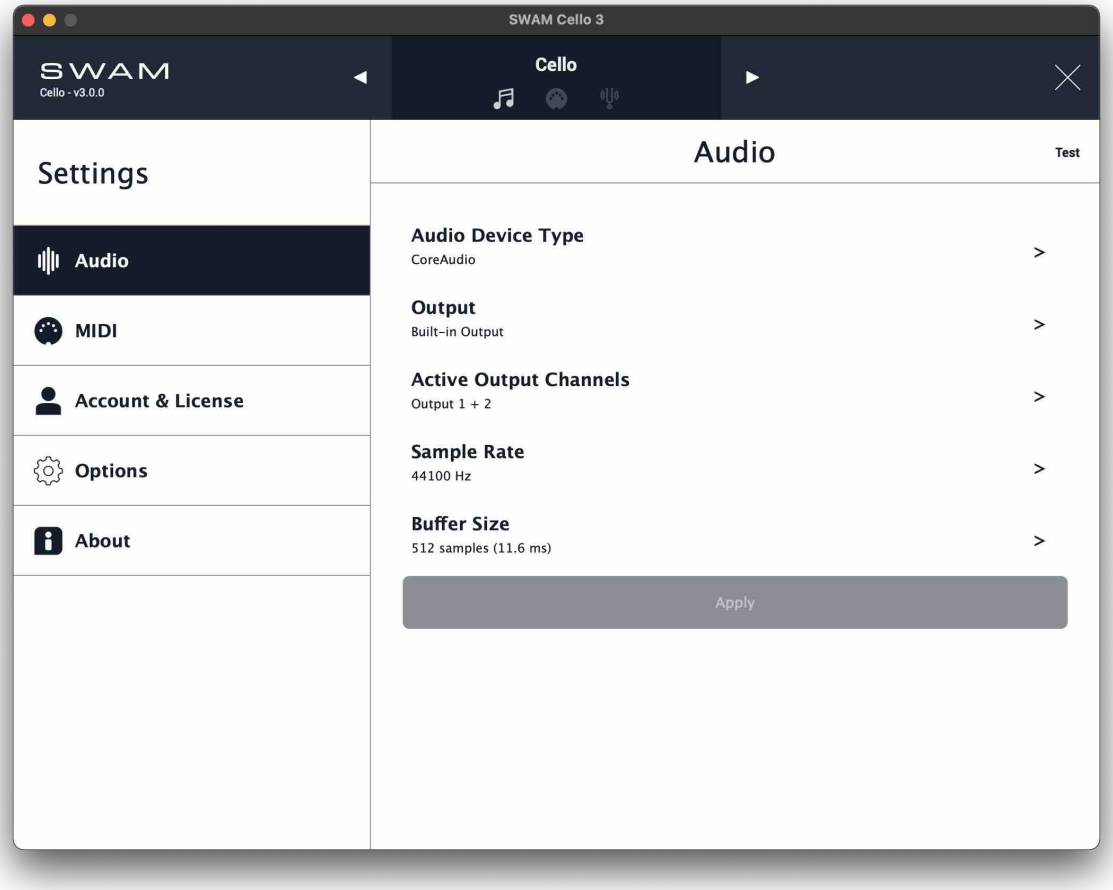
The Parameter Lock function is available with a long press on the current preset label:

Switch presets without affecting the category of parameters that is locked.

- Select “Sound Engine Parameters” if you want to freeze the sound when browsing your presets
- Select “External Controller Mapping” if you want to experiment with different presets, keeping the same MIDI controller mapping
- Select “Micro Tuning Settings” if you want to switch presets without affecting the micro tuning settings

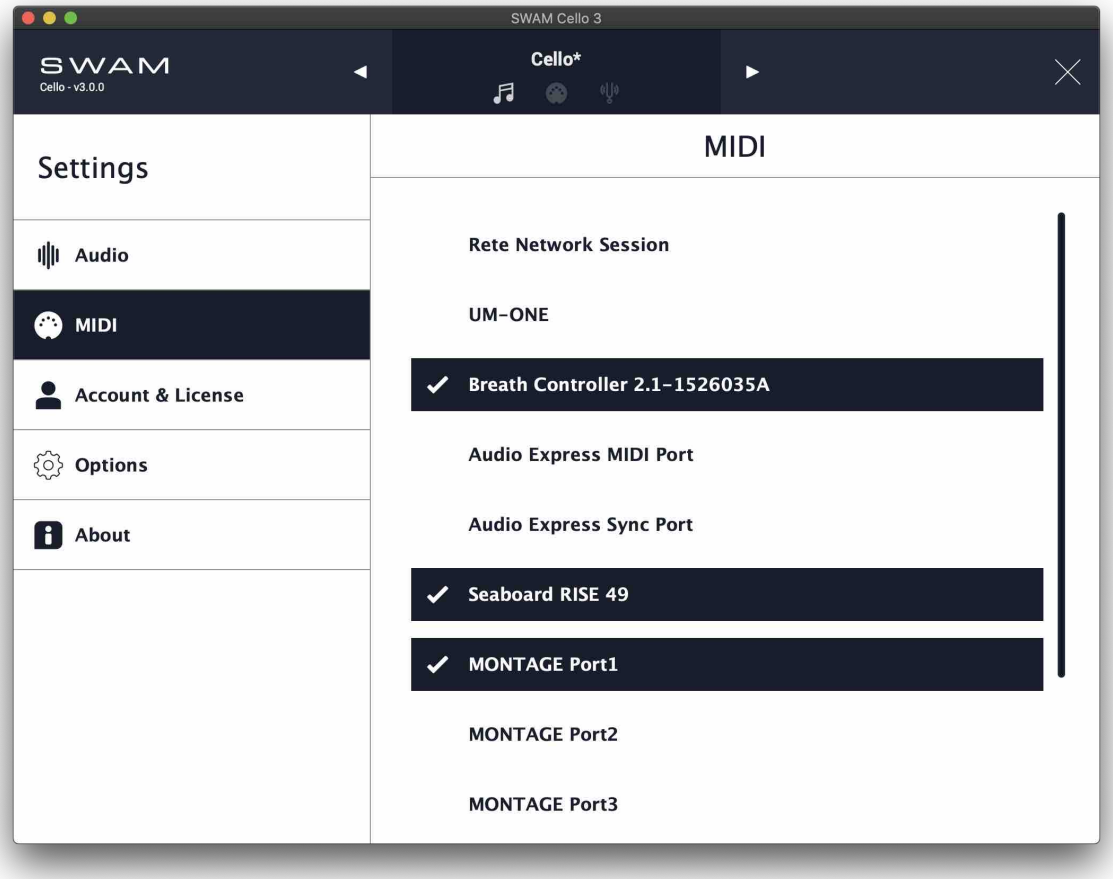
Settings

Audio Settings



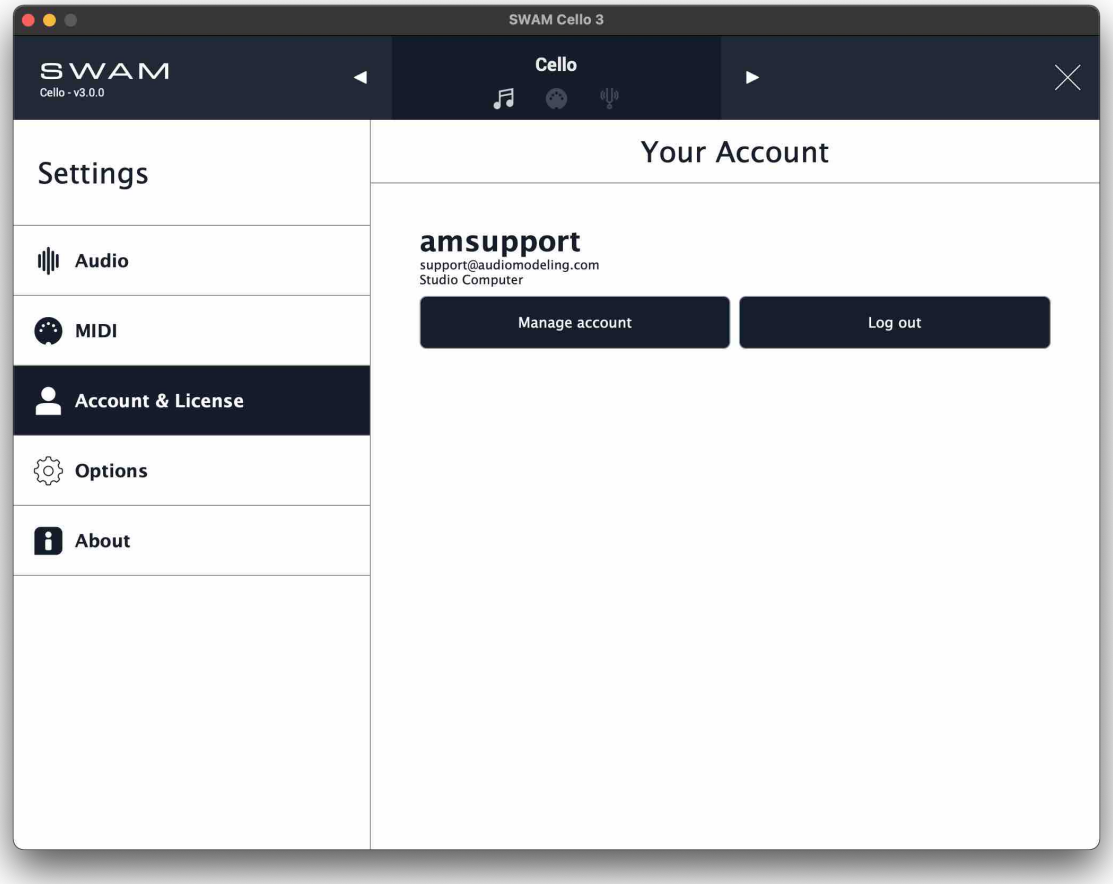
The Audio Settings page is available for the Standalone version only and allows to select the proper Audio device, Output port, Active channels, Sample Rate and Buffer Size.
For real time playing, a combination of Buffer Size and Sample Rate should provide a maximum latency of about 10 ms.

MIDI Settings



The MIDI Settings page is available for the Standalone version only and allows you to select one or more MIDI devices to control the instrument.
It's also possible to use a Bluetooth MIDI device by selecting "Bluetooth MIDI".

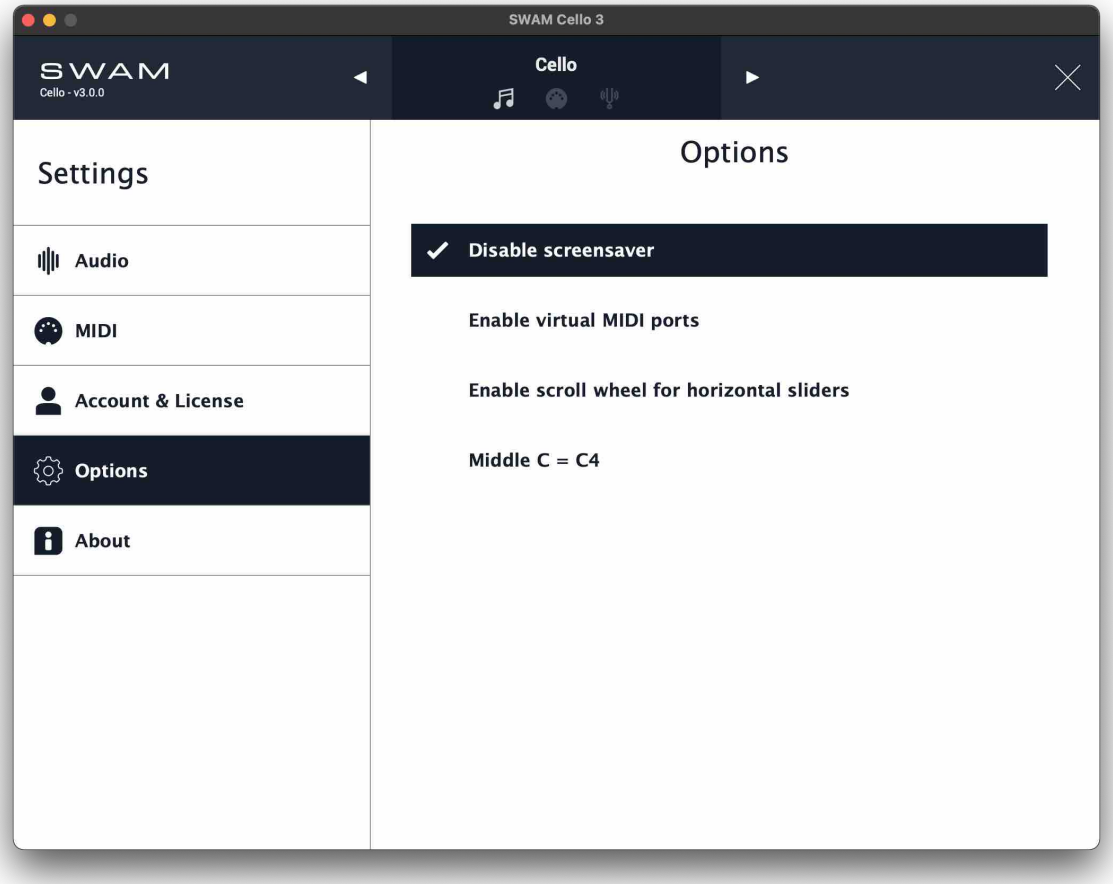
Account & License



The Account & License shows the user currently logged in.

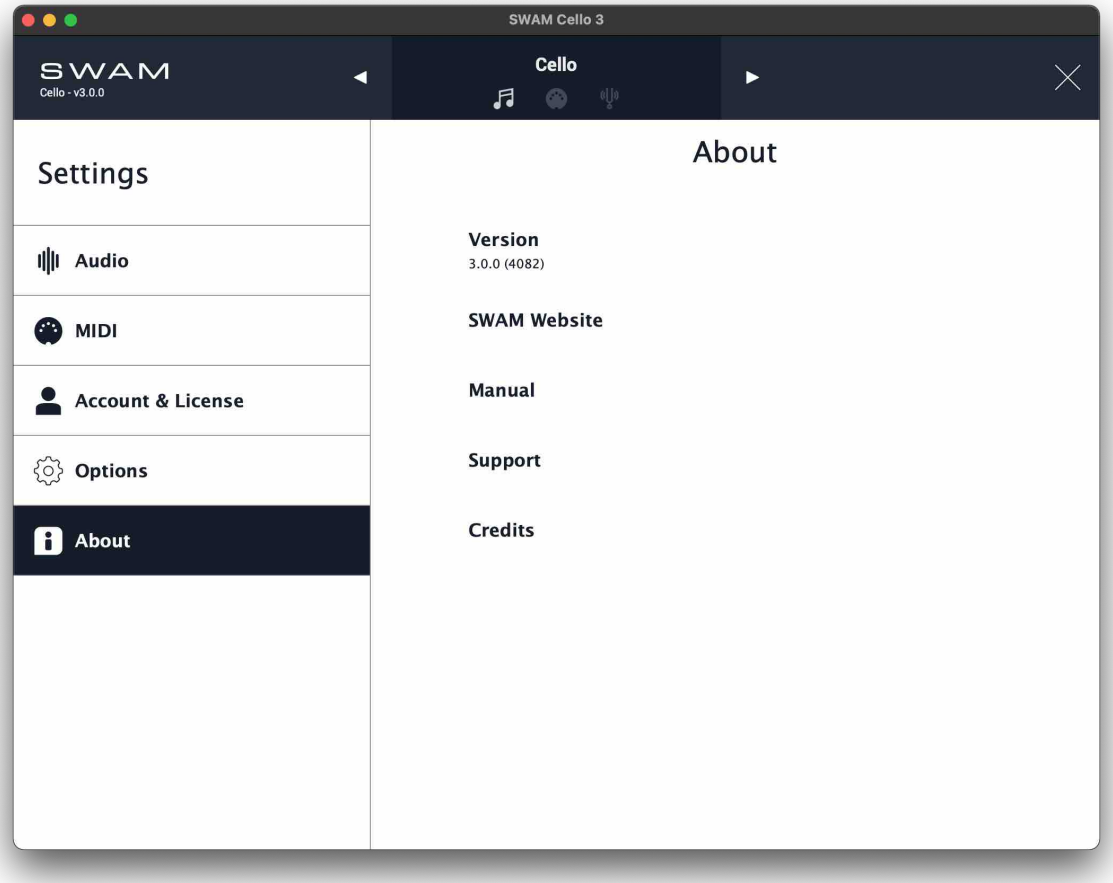
- Manage account: opens the Audio Modeling Customer Portal in a Web Browser
- Log out: logs the user out from the application

Options



- Disable screensaver: avoid screensaver activation when the App is open
- Enable virtual MIDI ports (macOS and iPadOS only): enable an Input and Output virtual MIDI port to control the instrument from an external App, or use the SWAM App to control another music App
- Enable scroll wheel for horizontal sliders: allow the use of the scroll wheel for changing values
- Middle C4: set octave notation so that Middle C is C4, corresponding to MIDI note number 60. If deselected, Middle C is C3.

About



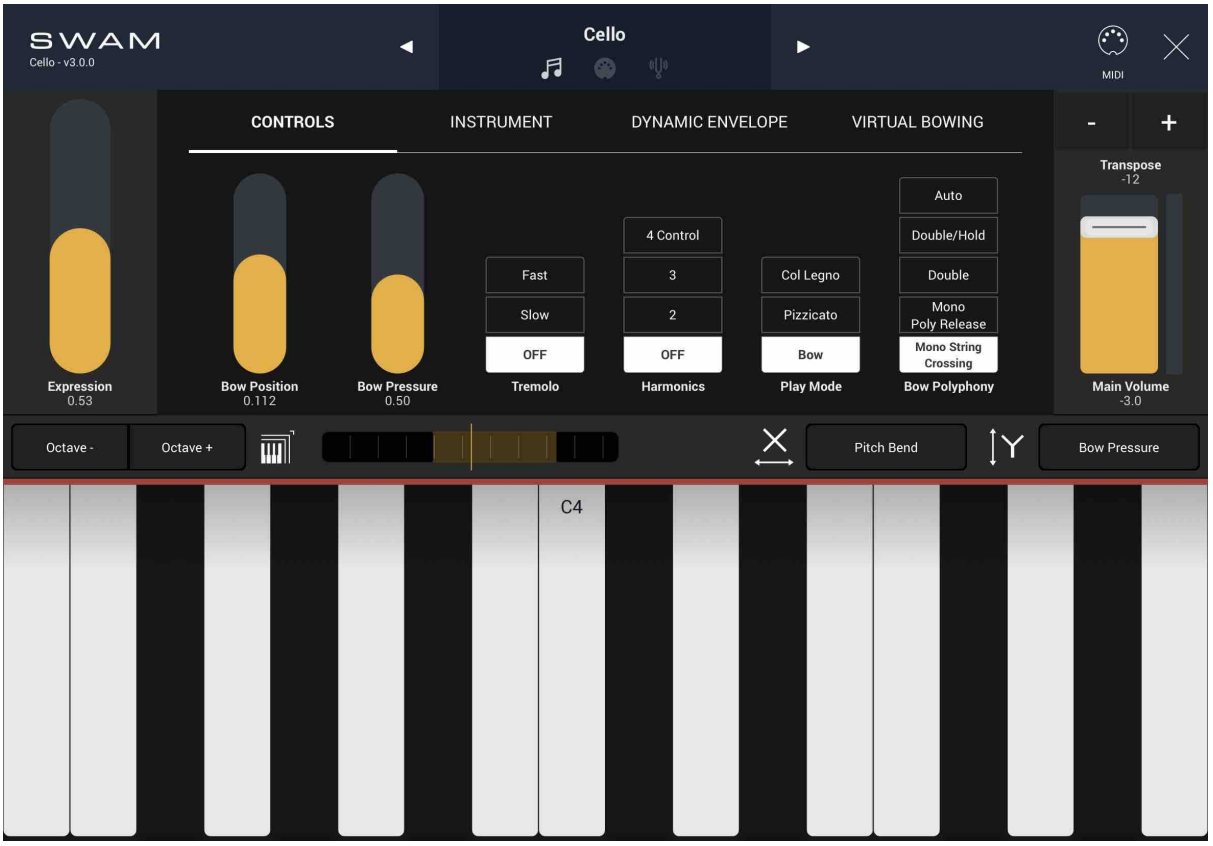
The About page shows the current version and build number, as well as a few other options:.

- SWAM Website: opens the SWAM section of the Audio Modeling website in a Web Browser.
- Manual: opens the online User Manual page in a Web Browser.
- Support: opens the Support Center page in a Web Browser.
- Credits: shows the credits page

Control Surface (for iPadOS only)

On iPadOS version, you'll find the "PLAY"icon 

to access a dedicated Touch Control Surface:



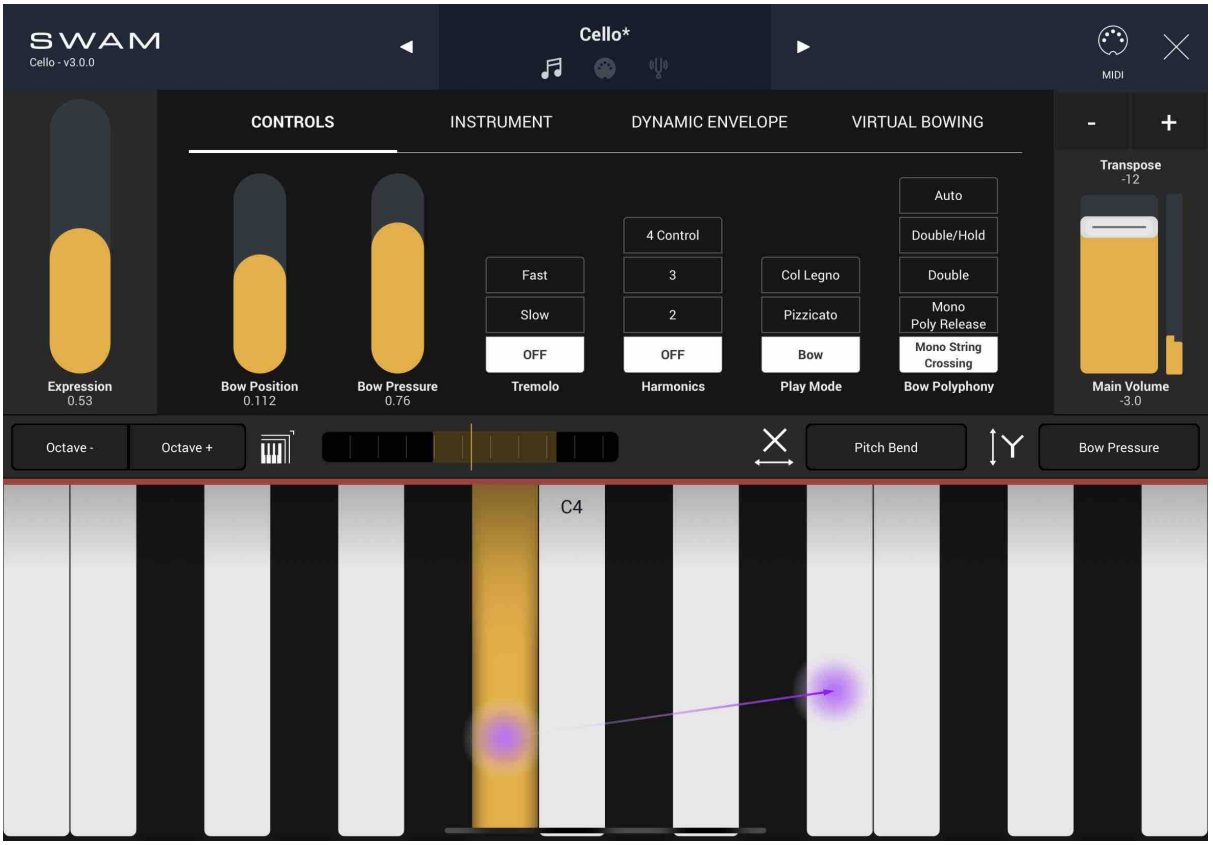
The control surface has the following purposes:

- provide an onboard screen keyboard to perform at basic level without using any external controller
- provide a visual feedback representation of the sound evolution (Dynamic Envelope)
- provide direct controls of the most useful performance parameters (expression, instrument selection, control faders and selectors), also with a dedicated area to mimic the bowing gesture directly on the iPad glass

NOTE: To record and playback on a DAW what has been played on the Control Surface, the "Control Surface Default" MIDI preset must be selected (ref. "MIDI Mapping Presets" paragraph).

The dynamic areas can be selected by tapping on the tab bar name:

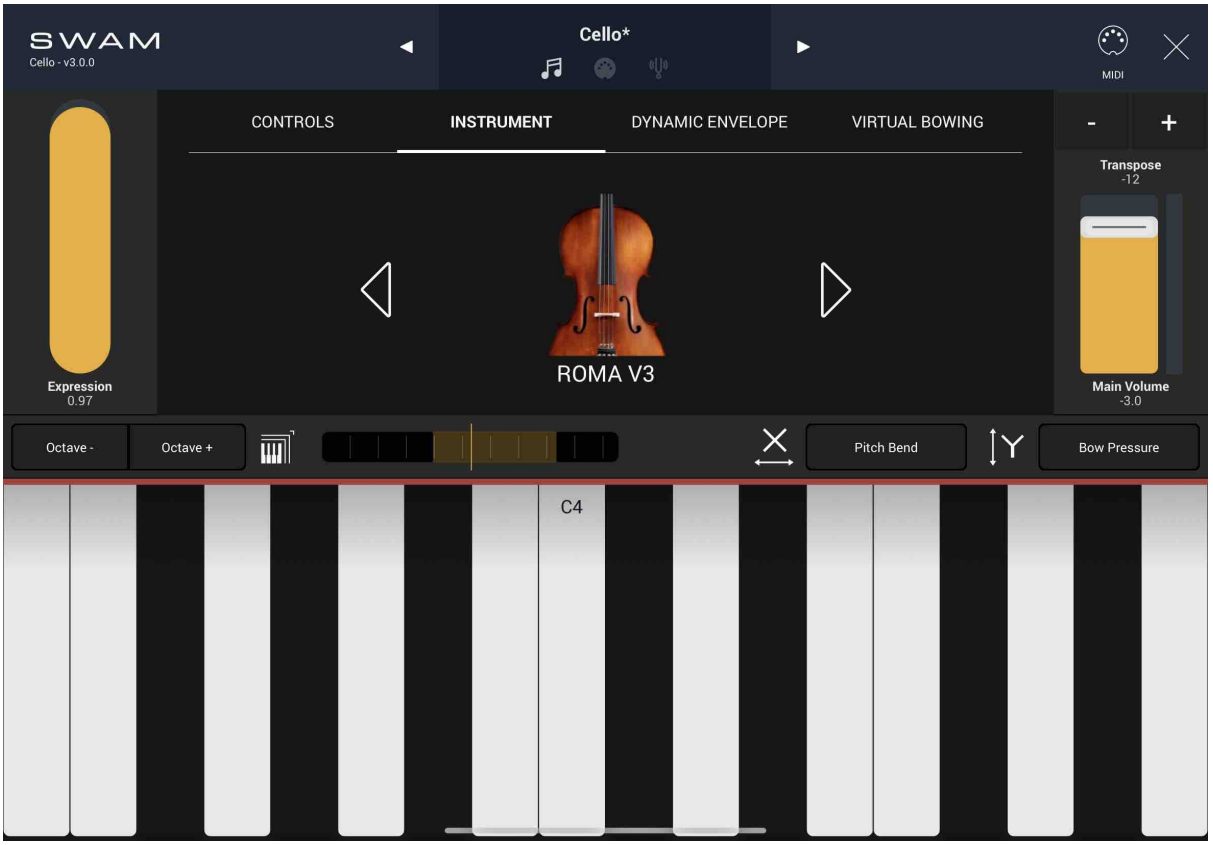
Controls



This view provides two faders and four selectors that are very handy for live performances to tweak the sound in real time or add subtle expressive details when needed. Play and tweak them in real time using the onboard keyboard, or use them as an extra control surface when playing with an external controller.

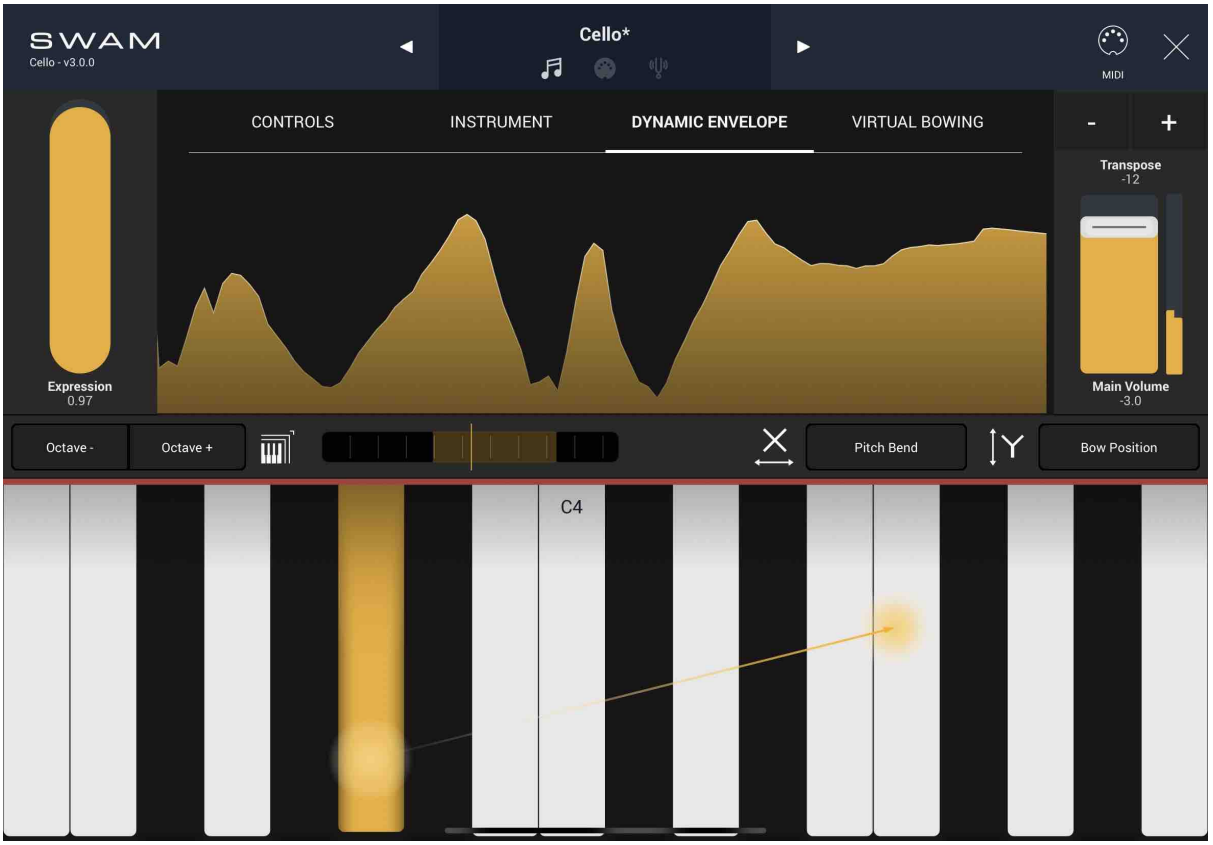
Audio Modeling

Instrument



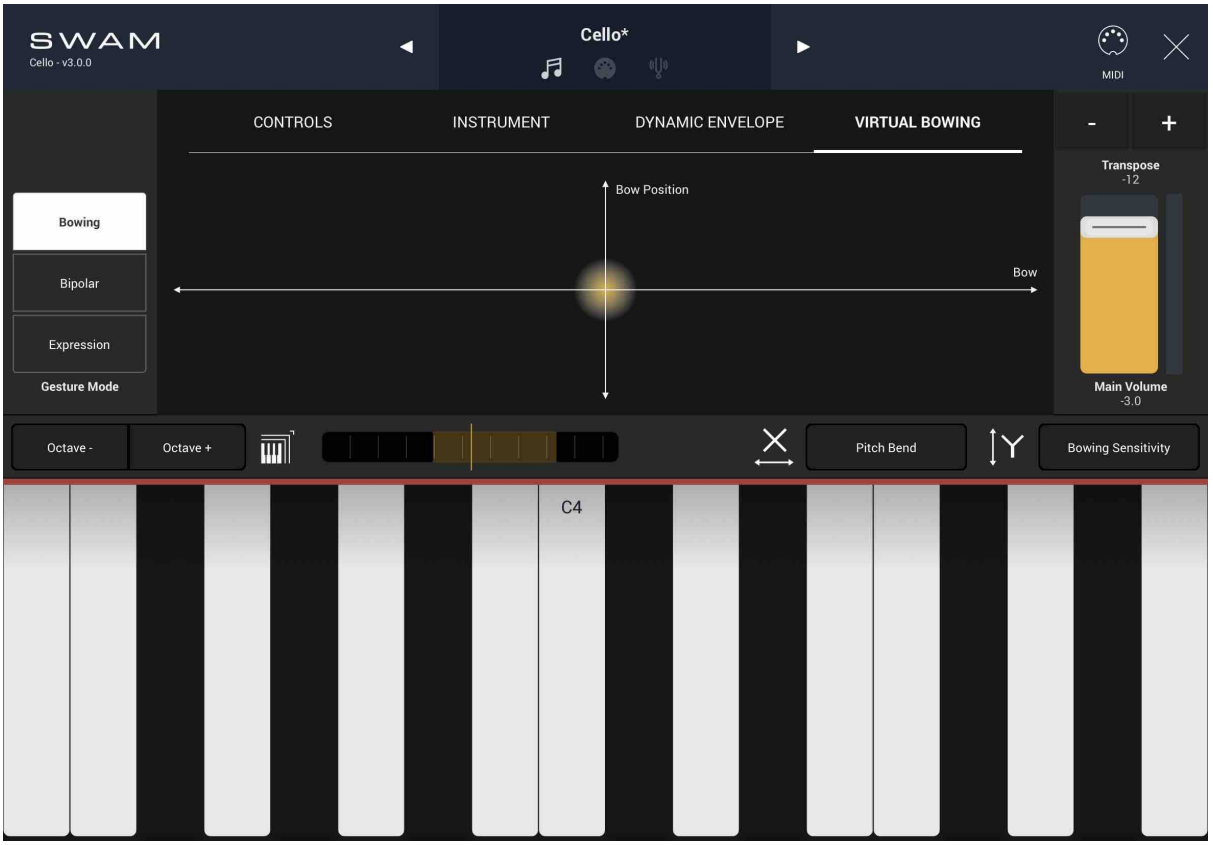
This view shows the instrument selector. Use the arrows to select different instrument bodies with different timbres and characters.

Dynamic Envelope



This view shows the evolutions of the sound in real time. The more you move the expression and other parameters, the more interesting and expressive SWAM plays. Move the expression to hear the nuances in the sound, and use the Dynamic Envelope to have a visual feedback.

Virtual Bowing



Virtual Bowing is an XY pad that allows the user to control Expression (X-axis) and Bow Position (Y-axis) in real time. It's especially suitable when "Gesture Mode" is set to "Bowing": in that case the user controls the bow back and forth, mimicking the gesture of a real player. Keyboard Y-axis gesture can be assigned to the "Bowing Sensitivity" parameter, allowing the user to control how strong the bow stroke is.

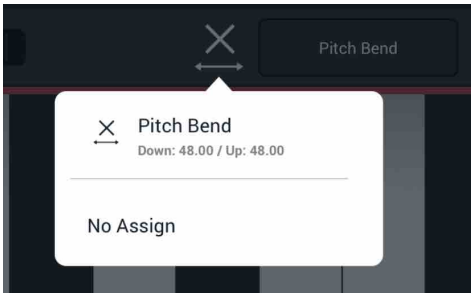
Control Surface Keyboard setup

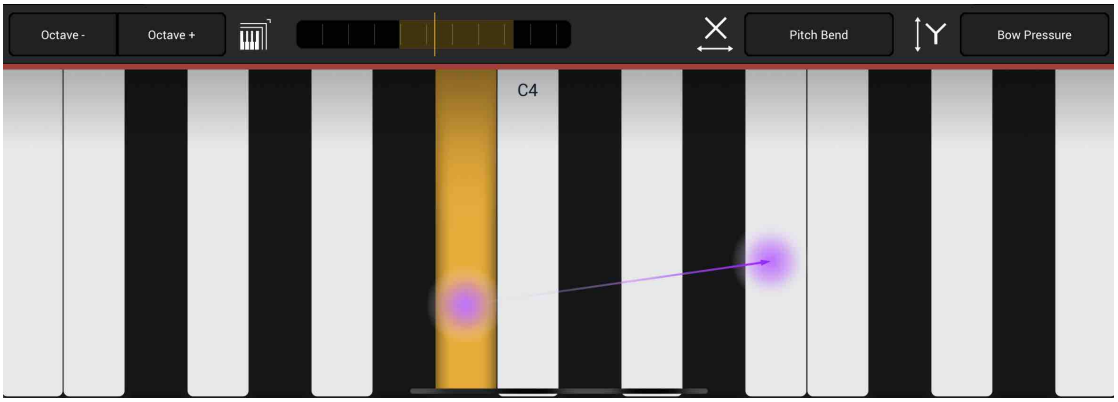
The keyboard has a toolbar with dedicated controls to:

- Shift the pitch by Octave (Octave - and + buttons)
- Manage the Keyboard size: you can select a smaller size to have more keys on screen
    - Small (show 1 octave - 13 keys)
    - Medium (show 1.5 octave - 18 keys)
    - Large (show 2 octave - 25 keys)
- Scroll the keyboard: drag the ribbon to adjust the starting point of the keyboard
- X and Y direction assignment: configure the modulation behavior for finger movement on horizontal and vertical directions

X: Pitch Bend control by X-axis

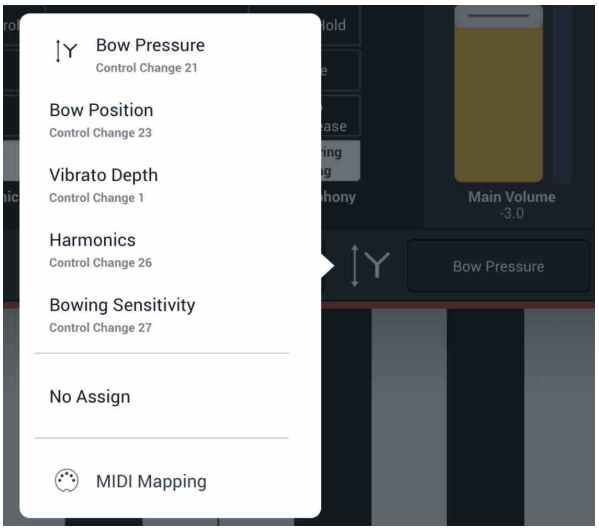
Tap on it to show pitch-bend range or to unassign pitch-bend control

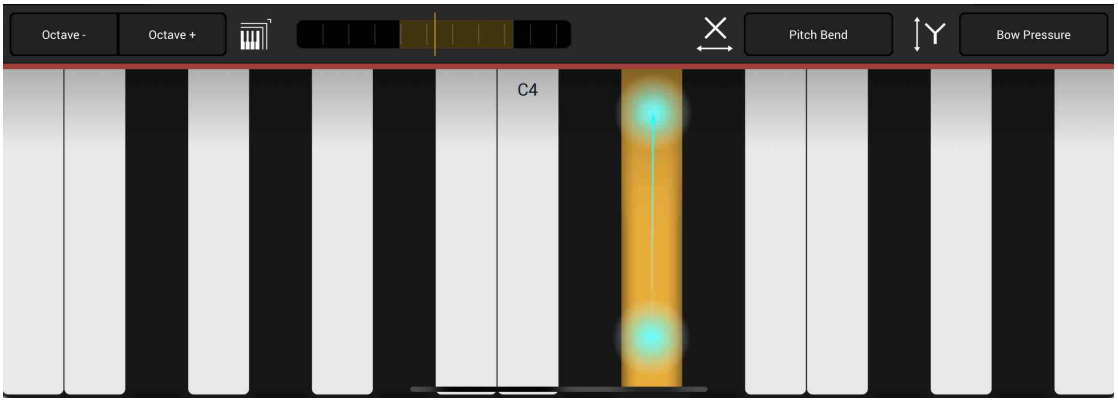




Y: parameter control by Y-axis

Tap on it to change the parameter assignment to a Y-axis gesture (by default assigned to "Bow Pressure" parameter), and to check what MIDI mapping is defined for the controlled parameter. A shortcut to the MIDI mapping page is provided to easily change the MIDI mapping for the controlled parameter. This is useful when using the Control surface for recording MIDI on a DAW or controlling an external instrument





KeySwitches

Some parameters of SWAM instruments can also be triggered by the use of key switches. If there is an overlap in the instrument range after transposition, the key switches can be moved down one octave using the "KS Octave" parameter (see Advanced section). Key switches can be disabled by turning "KS Octave" To "OFF".
The key switches are colored red on the virtual keyboard of the instrument.

Important note about Key Switches: "latch" Key Switches are sensitive to the K.S. velocity, even for 2-state Key Switches. This way a sequence can be played correctly even if it is not started from the beginning; otherwise a "latch" status could work differently than how it should.
"KS Velocity Remap" adjusts the distribution of the KeySwitch values

The Key Switches provided are:

- C = Play Mode (at next note-on)
    - Low Velocity = Bowed
    - Mid Velocity = Pizzicato
    - High Velocity = Col Legno
- C# = Manual Bowing
  (see "Manual Bowing: KeySwitch" in Play Modes / Right Hand section)
    - Tremolo: Note-on / Note-off
    - Bow Change: Note-on only
- D = Gesture Mode (at next note-on)
    - Low Velocity = Expression
    - Mid Velocity = Bipolar
    - High Velocity = Bowing
- D# = Alternative Fingering (at next note-on)
    - Low Velocity = Mid Position
    - Mid Velocity = Near the Bridge
    - High Velocity = Near the Nut + Open
- E = Bow Lift
    - Off String (default)
    - While this key is held = On String
- F = Bow Start (Down / Up)
- F# = Harmonics
    - Off (default)
    - Low Velocity = 2nd harmonic
    - High Velocity = 3rd harmonic

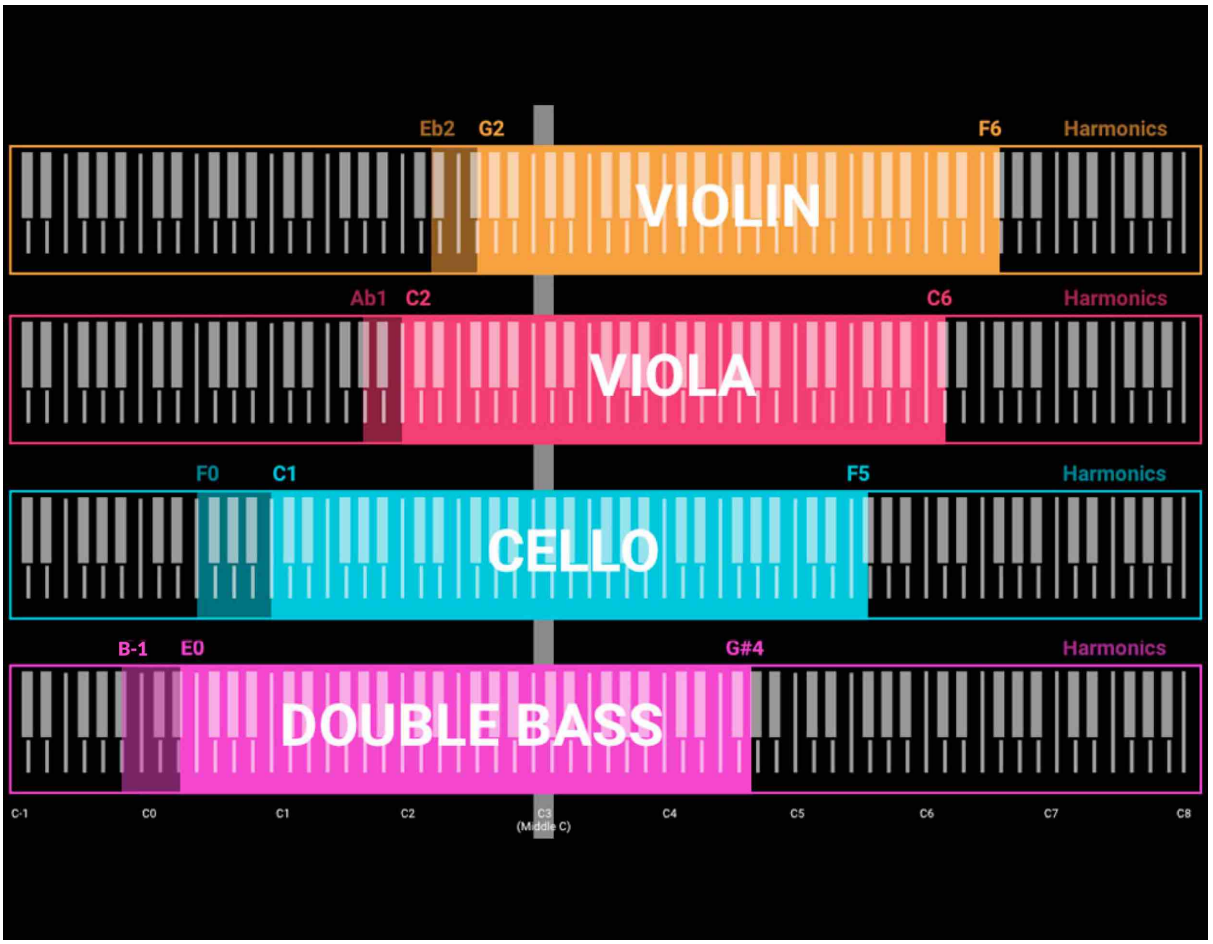
  Note: it's not possible to control the 4th harmonic through Key Switches
- *G: [TBD]*

- G# = Tremolo
    - OFF (default)
    - Low Velocity = Slow
    - High Velocity = Fast
- A = Tremolo Mode (at next note-on)
    - Low Velocity = Hz
    - Mid Velocity = Sync
    - High Velocity = Sync/Acc
- A# = Sordino (at next note-on)
    - Low Velocity = OFF
    - High Velocity = ON
- B = 2nd page

2nd page of Key Switches (hold B Key Switch)

- B+C: Real Mono
- B+C#: Mono
- B+D: Double
- B+D#: Double/Hold
- B+E: Auto
- B+F#: Preferred strings 4-3 (for Doble/Hold only)
- B+G#: Preferred strings 3-2 (for Doble/Hold only)
- B+A#: Preferred strings 2-1 (for Doble/Hold only)

Instruments ranges



How to perform the main articulations

Almost all articulations are performed by the combination of the three principal controls: note-on velocity, expression, and bow-pressure. The instrument is so versatile that multiple articulations can be combined together - for example, tremolo/vibrato, tremolo/glissando, glissando/vibrato, glissando/harmonics/crescendo are possible. Here's a short list of main articulations.

Détaché

Detaché articulations are performed by separating the notes while pressing the Sustain pedal: the note-off of the first note must happen before the note-on of the second note. A Slurred Legato is performed when the notes are overlapped while pressing the Sustain pedal.

Martelé

Set the "Bow Lift" parameter to "On String" and use high velocities and high expression at Note-on, then decrease the expression.
If you want to obtain a scratchier attack, set the "BowPressure" to a high value (0.65 – 0.80) just before the attack. Then, quickly decrease it to the desired value while decreasing the expression.

Spiccato

Set the "Bow Lift" parameter to "Off String" and play short staccato notes.

Legato

Slurred legato

A pure "slurred" legato is performed by overlapping the second note to the first, using a high value of note-on velocity for the second note, when the second note is selected on the same string as the first one.

Cross-string legato

A "cross" legato is performed by overlapping the second note to the first, using a high value of note-on velocity for the second note, when the second note is selected on a different string than the first one.

The choice Slurred vs Cross-string legato is mainly determined by the "Alternate Fingering" parameter. Setting the "Alternate Fingering" parameter BEFORE pressing a note determines which string is selected for the pressed note.
The actual threshold between portamento (see next paragraph) and legato is influenced by the "Portamento Max Time" parameter.
The legato transition "quality" is influenced by the "Dynamic Transitions" parameter.

Portamento (glissando)

A glissando between two notes is obtained by overlapping the second note to the first, using a low value of note-on velocity for the second note. If the "Portamento Control" parameter is set to "CC" just overlap the second note after setting the "Portamento Control" CC value to a low value (depending on the MIDI mapping curve defined for the "Portamento Time" parameter - See "Controller Mapping" section).
The actual portamento time and the threshold between portamento and legato are influenced by the "Portamento Max Time" parameter.

Continuous vs Split Portamento

If the second note is selected on the same string, a continuous portamento on the same string is performed. Otherwise, a "split" portamento across two strings is performed starting from the string of the first note to the string of the second note. The "split point" of the "split" portamento is determined by the "PortamSplit Ratio" parameter.

How to obtain a portamento on the same string

To obtain a wide portamento on the same string, avoiding a split portamento across two strings, you need to control the starting and ending position of the finger on the fingerboard acting on the "Alternate Fingering" parameter.
To do this in real time, use the "Alternate Fingering" Key Switch D# or control the "Alternate Fingering" parameter through a MIDI CC (see "Controller Mapping" section).
Note that the effective finger position changes at the next note-on, so you have to be able to set the right finger position BEFORE pressing the portamento starting note and also BEFORE pressing the portamento ending note.
Example:

1. Set the "Alternate Fingering" position to "Nut+Open" (K.S. D# - high velocity, MIDI CC – high value).
2. Press the note E3, it should perform on the string D, near the nut.
3. Set the "Alternate Fingering" position to "Bridge" (K.S. D# - mid velocity, MIDI CC – mid value).
4. Press the note E4, it should perform on the same string D, near the bow.

Flautando

To get a "flautato" sound, set the "Bow Pressure" parameter to a very low value. The text "Flautando" is shown near the Bow Pressure slider on the main GUI.

Scratch

To obtain a very scratchy sound, set the "Bow Pressure" parameter to the maximum value and play with high expression. The text "Scratch" is shown near the Bow Pressure slider on the main GUI.

Tremolo

Auto-tremolo

This selects if you want a "Slow" tremolo or a "Fast" tremolo. If the "Tremolo Mode" is set to "Sync" or "Sync/Acc", the tremolo will be synchronized with the project tempo (BPM). Custom accents can be performed by acting on the expression (make expression "spikes" on the desired strokes).

Manual-tremolo

- Using Key Switch C#: be sure that Key Switches are active (Advanced / MIDI section). Set the "Manual Bowing: KeySwitch" to "Tremolo" (Play Modes / Right Hand section); press and release the Key Switch C# while playing the notes; a bow-change is performed at both note-on and note-off.
- Using the currently playing note: set the "Manual Bowing: Sustain+Note" parameter to "Tremolo"; hold the Sustain pedal, press and release the currently playing note; a bow-change is performed at both note-on and note-off.

You can adjust the "Bow Pressure" parameter in order to obtain a smooth or hard tremolo.

Bowing

Set the Gesture Mode to Bowing and move your expression controller back and forth.
Adjust the "Bowing Sensitivity" parameter to modify the amount of

Crescendo

Standard Crescendo: Crescendo is performed acting only on the Expression, starting from a low value (or from "niente") and increasing it as desired.

Wider Crescendo: A wider effect can be obtained by mapping the "Bow Pressure" parameter to the same MIDI event that controls the Expression (see "Controller Mapping" section).

For example:

- Expression: CC 11 – Min = 0, Max = 127
- Bow Pressure: CC 11 – Min = 55, Max = 80

Start "from nothing" (fade-in): set the Expression to zero, hit the key with a very low value of the velocity (under MIDI value 10), then increase the Expression as desired.

Known issues / Open points

- Window resizing for plug-ins: on some hosts and DAWs, it's required to close and reopen the plug-in window to apply the new size.
- Key Switch for "Pizzicato Poly" not implemented yet
- G Key Switch not implemented yet
- Plugin state not restored in Cubase for VST2.4 (works for VST3 plug-in format)
- Ableton Live: every time a parameter mapped on any CC number is modified with an automation, the action is added to Ableton's Undo list.
  This behaviour does not happen with other DAWs.

Technical Support

Before requesting technical support, please make sure you have carefully read the **User Manual** and the **FAQs** on our Support Center at audiomodeling.com/support.
There, you'll quickly find appropriate answers to most questions.
Should you still need technical support, please contact the SWAM support team at support@audiomodeling.com or open a Ticket through our Support Center.

Note: Please ensure you enter your email address carefully — it's not possible for us to reply to an incorrect email address.

When requesting technical support, please don't forget to provide as much system information as possible, including your type of computer, OS, audio interface, host application, software version, etc. If the problem can be replicated, a MIDI and/or an audio file is usually very helpful.

In order to provide effective and quick support, please include a reference to either the user account, order number or one of the License Keys.