

SWAM String Sections User Manual



v1.1.0



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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 Audio Modeling YouTube channel at youtube.com/c/AudioModeling.

The latest version of all SWAM manuals can be found at audiomodeling.com/manuals.
Release Notes are available at audiomodeling.com/support/release-notes.

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, Studio One, Digital Performer, Reaper, LUNA, etc.

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 parameter has to be controlled continuously via MIDI. Constant variation of the Expression is the key of expressive playing.”, with actions to select or map an external MIDI controller.

Expression parameter has to be controlled continuously via MIDI. Constant variation of the Expression is the key of expressive playing.

MIDI Controller Presets

Manage MIDI Mapping

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. It's possible to switch to Middle C = C4 from the Options page.

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.

Specifications

macOS 10.13 (High Sierra) – 14.0 (Sonoma) *

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

Windows 10, Windows 11

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

** Apple Silicon architecture supported natively*

All SWAM apps and plugins are navigable by the native accessibility frameworks on macOS and Windows.

Required space after installation: 29 MB per single plugin format + 291 MB for shared resources and assets, 430 MB for the complete String Sections bundle (all plugin formats).
RAM occupancy: about 330 MB for each instrument instance.

Installation

macOS and Windows

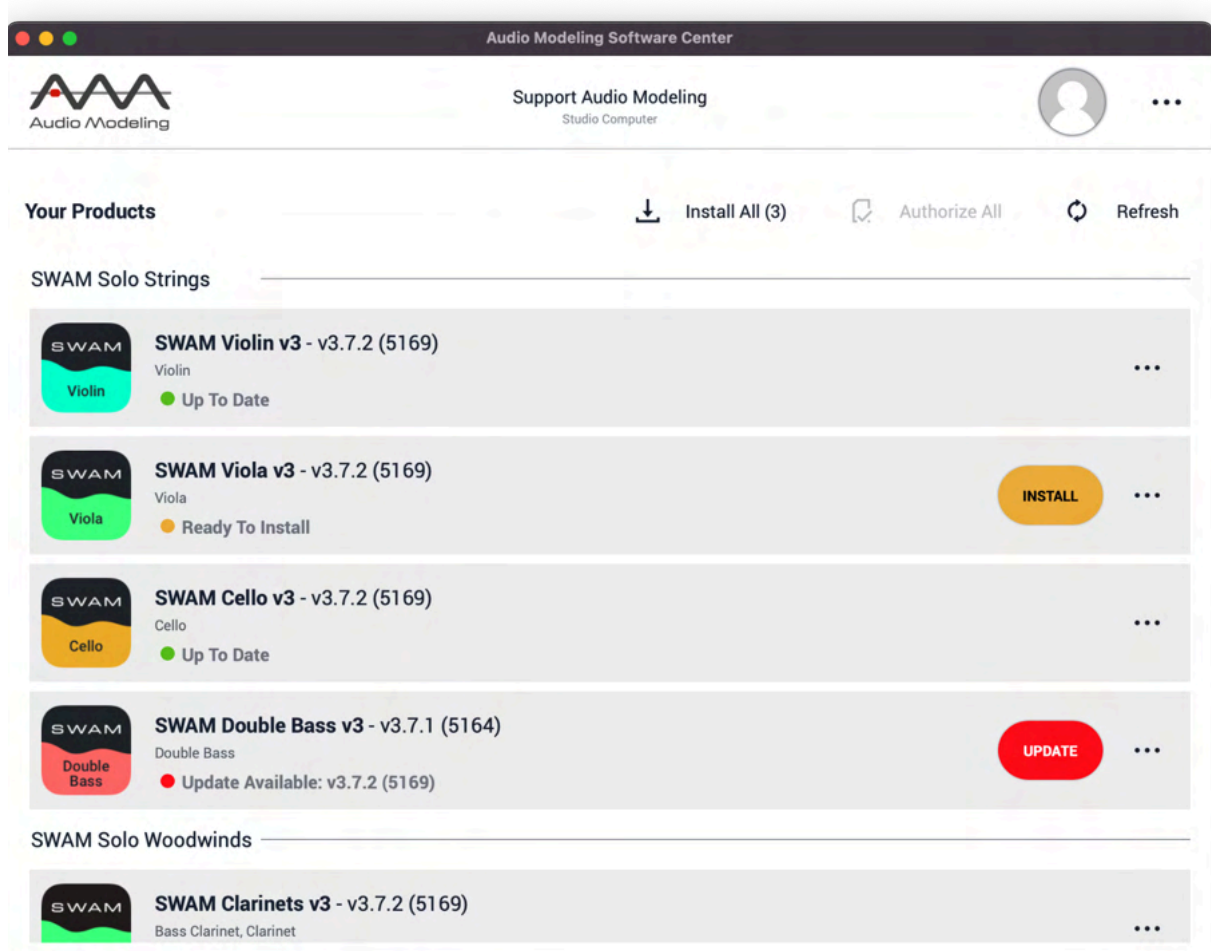
Product Registration and Installation

- 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 Redeem code provided, select "Next"
- 4) the portal will send an email to you. Click the confirmation link on the email
- 5) download, install and launch the "Audio Modeling Software Center", available at <https://audiomodeling.com/support/install-and-update>, to download and authorize the products on your computer.

If you installed a previous version

The updates are managed through the Audio Modeling Software Center.

NOTE: the products 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 in the folder chosen in the Audio Modeling Software Center, by default: /Applications/Audio Modeling/SWAM String Sections
- 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
- Factory presets and auxiliary resources are stored under: /Users/Shared/Audio Modeling/SWAMv3/Sections/String Sections
- User presets are stored under: ~/Library/Audio Modeling/SWAMv3

Windows

- Standalone app, End User License Agreement, Uninstaller are located in the folder chosen in the Audio Modeling Software Center, by default: C:\Program Files\Audio Modeling\SWAM String Sections
- VST3 plug-ins: the installation path is defined in the Audio Modeling Software Center, default: C:\Program Files\Common Files\VST3
- VST plug-ins: the installation path is defined in the Audio Modeling Software Center, default: C:\Program Files\VSTPlugins
- AAX plug-ins are located under: C:\Program Files\Common Files\Avid\Audio\Plug-Ins
- Factory presets and auxiliary resources are stored under: C:\Users\Public\Documents\SWAMv3\Sections\String Sections
- User presets are stored under: %AppData%\Audio Modeling\SWAMv3

Hardware Requirements

CPU load

The realism and expressiveness of the SWAM instrument set can be CPU intensive. It therefore requires a modern computer with at least a 2.5 GHz 4-Core CPU for a single instance of any section plugin. Additional instances will require both a more powerful processor and a low-latency audio driver/device (e.g. ASIO), especially to play the instrument in real-time.

Less powerful systems may also prove satisfactory, but may require larger buffer sizes, which incur higher latencies.

Note: This may not necessarily result in an actual problem for music production. Using the freeze feature or bouncing the single MIDI tracks to audio provides a useful remedy.

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, iPad and iPhone.

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, Robkoo R1 - 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](https://www.camelotpro.com)).

A list of compatible hosts and DAWs can be found on our Knowledge base: audiomodeling.com/support.

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.

The Expression slider on the main GUI becomes “hot”, i.e. with a red halo surrounding it, if the level of expression stays constantly above 75%. When you see such a red alert warning, please consider avoiding such extensive use of higher 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 String Sections is a collection of solo string instruments conceived and developed by Stefano Lucato and the Audio Modeling team. These instruments are based on a Hybrid Modeling technology, combining Physical Modeling, Sample Morphing and Behavioral Modeling techniques.

The SWAM String Sections collection includes four string sections: Double Basses, Cellos, Violas and Violins.

Each section emulates an ensemble of musicians sitting next to each other, with each musician playing a slightly different instrument (varying in body, strings, and bow), resulting in unavoidable tone, timing, intonation and performance differences ("humanization"). Those differences are fundamental to create the typical "ensemble" sound and contribute to the realism of the resulting performance.

Sections are placed in a virtual room, allowing for flexible placement of each group of musicians. Sound reflections and reverberation adjust accordingly, also in accordance with the chosen room dimensions, absorption materials, and microphone positioning.

Furthermore, the placement of multiple sections of the same type is free from phasing artifacts, thanks to the automatic "Anti-Phasing Divisi" selection.

SWAM String Sections instruments come as a Standalone application, VST, VST3, Audio Units and AAX plug-ins for Desktop, and Standalone App.

Any section 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.

Read [How to perform the main articulations](#) chapter for more info.

Note: an important setting that influences the "pianissimo" dynamic behavior is described at the [Important note for Expression remapping](#) paragraph.

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.
- Room & Position: internal Spatializer and Reverb.

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

Main controls

- Instrument (left/right arrows)
Use the arrows to select the size of the section, i.e. the number of actual players.
- 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)
[mapped to Key Switches B+F, B+G]
 - 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).

- 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.

- 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").

Note: even if Gesture Mode is set to Bipolar mode, when Tremolo is active the Gesture Mode is forced to Expression, because the bow change is defined by the auto-tremolo algorithm.

- 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.




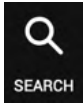
- Sordino

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

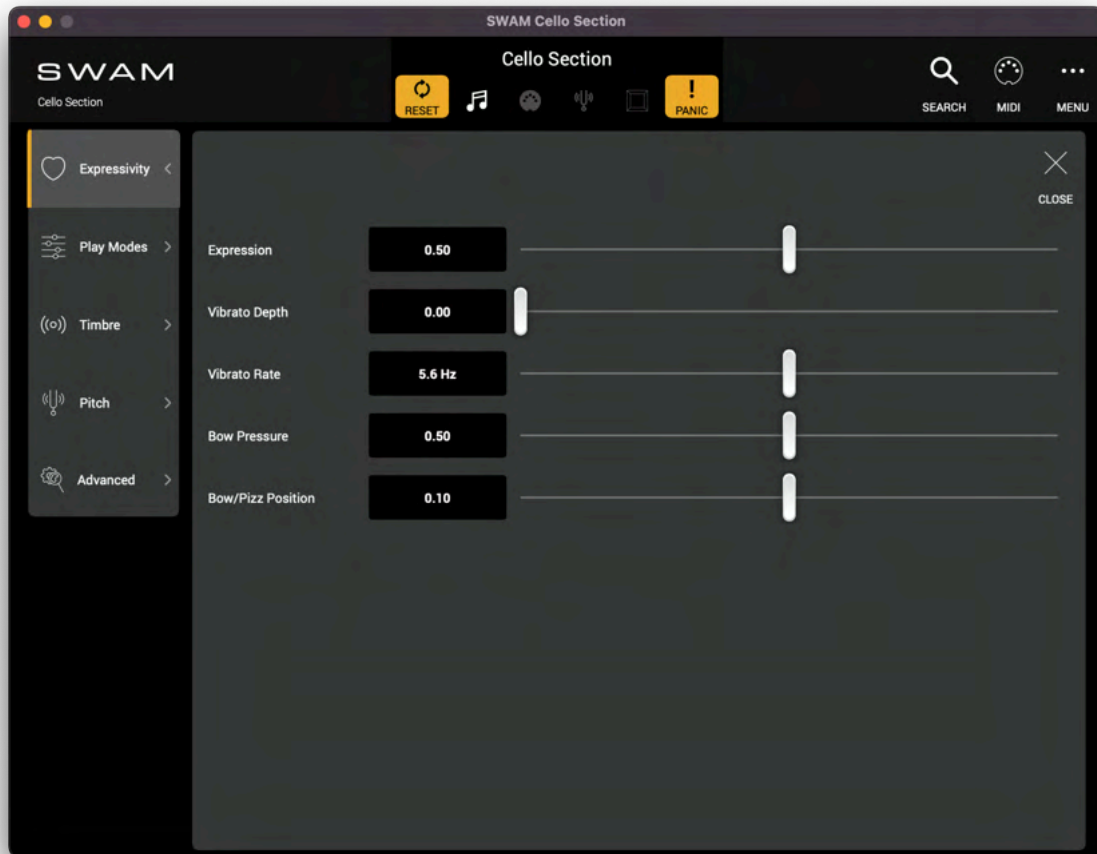
- Room & Position: shows a preview of the sections and microphone positioning in the virtual room, and opens the embedded Room Simulator view.

- Main Volume: main output volume.

Header section

- SWAM logo : clicking or touching the SWAM logo opens the About section.
- Main menu icon : opens the main menu page that provides access to:
 - Preset Manager
 - Reset
 - Controller Mapping
 - Parameter Lock
 - Import
 - Export
 - Settings
 - "Save" and "Save as..."
- MIDI Mapping icon : open the MIDI mapping management section.
- SEARCH icon : open the expert section for browsing parameters all at once.
- 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
 - Room Simulator: reset or load Room Simulator parameters
 - Section Position: reset to the default section position.
- PANIC: use this in case of stuck notes.

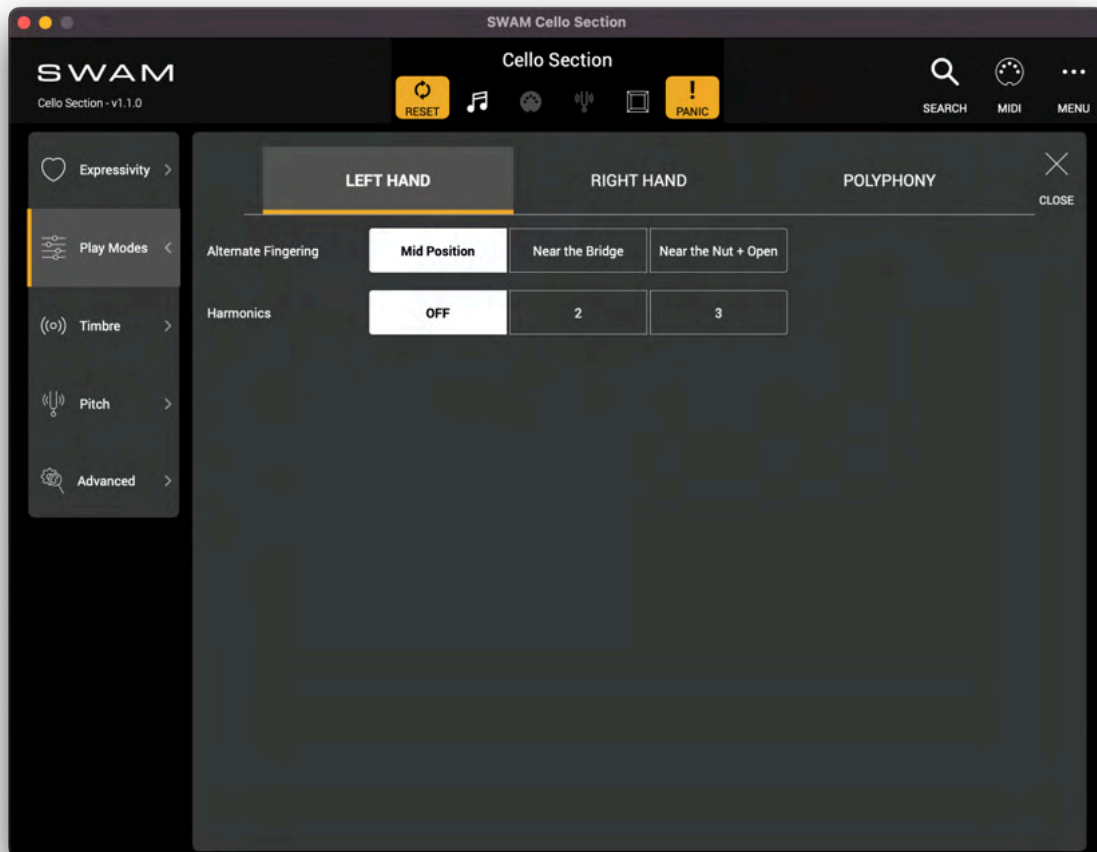
Expressivity



- 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".

Play Modes

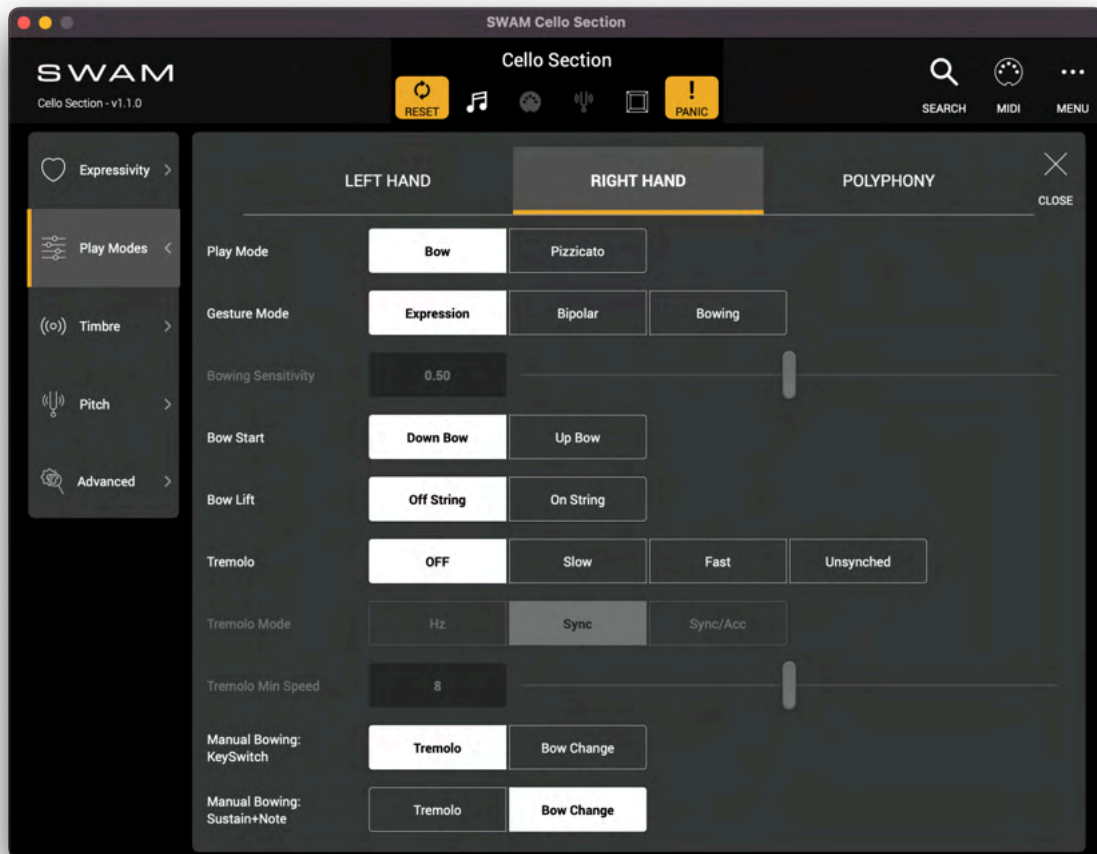
Left Hand



- 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 (twelve semitones higher).

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 (mono only).
- 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.

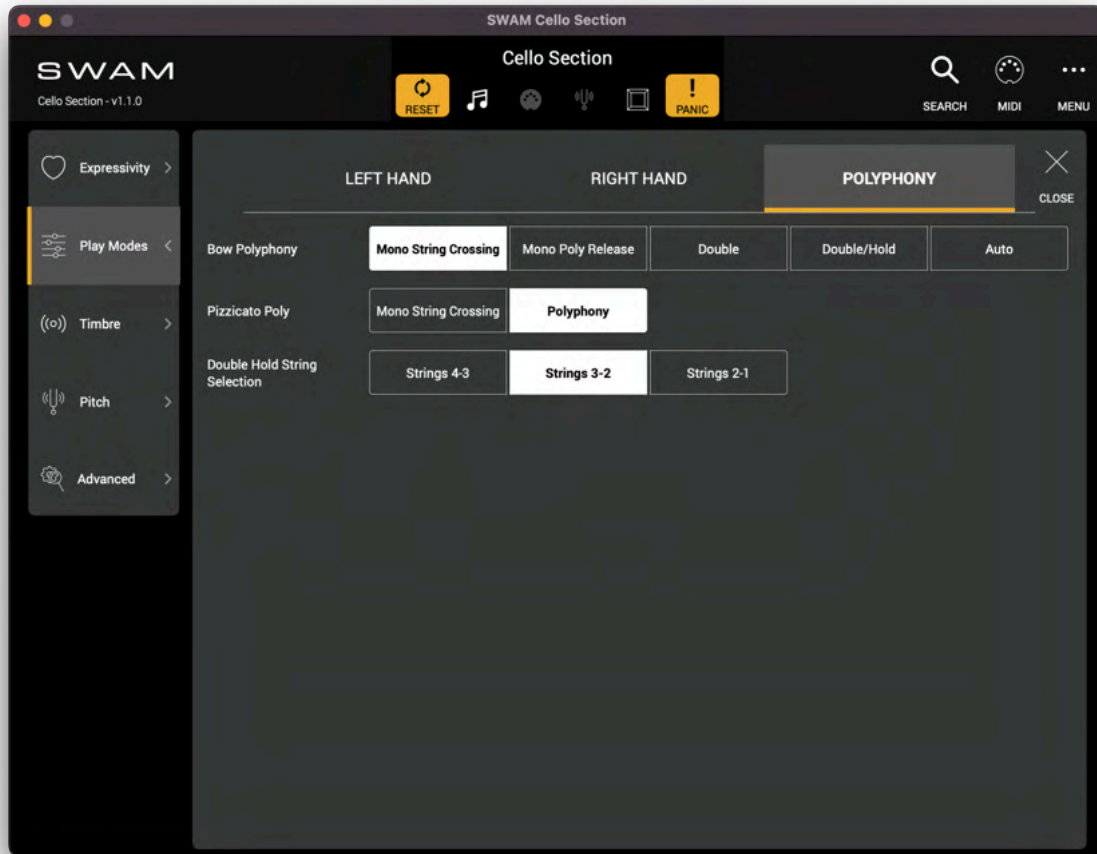
- Bowing: expression is interpreted as the displacement of the bow, the speed is proportional to the speed of the controller change. See also the "Bowing Sensitivity" parameter. Note: this gesture is not suitable for Breath and Wind Controllers. It is intended for pedals, wheels, ribbons, X-Y pads and 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").

Note: even if Gesture Mode is set to Bipolar mode, when Tremolo is active the Gesture Mode is forced to Expression, because the bow change is defined by the auto-tremolo algorithm.

- 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.

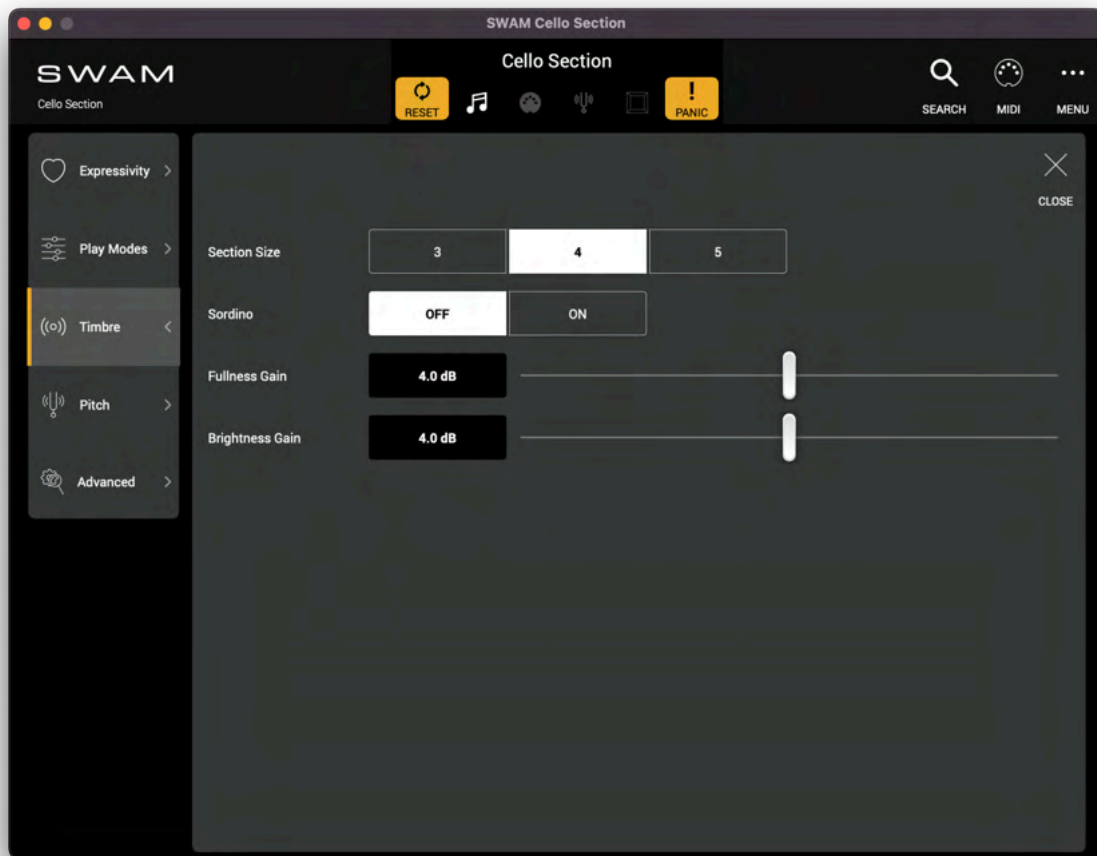
Polyphony



- 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)
[mapped to Key Switches B+F, B+G]
 - 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.

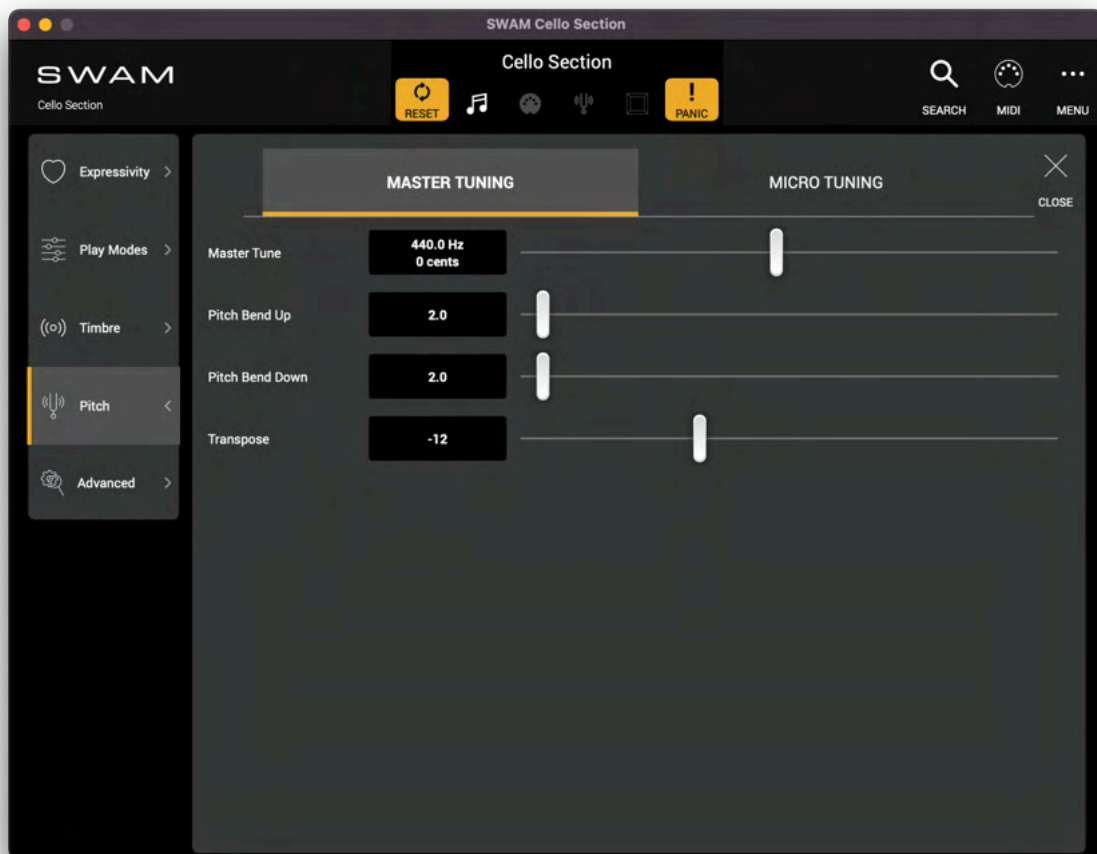
Timbre



- Section Size: select the number of the section players
- Sordino:
 - OFF: no mute applied
 - ON: a sordino is applied to obtain a muted sound
- Fullness Gain: boosts the low frequencies
- Brightness Gain: boosts the high frequencies

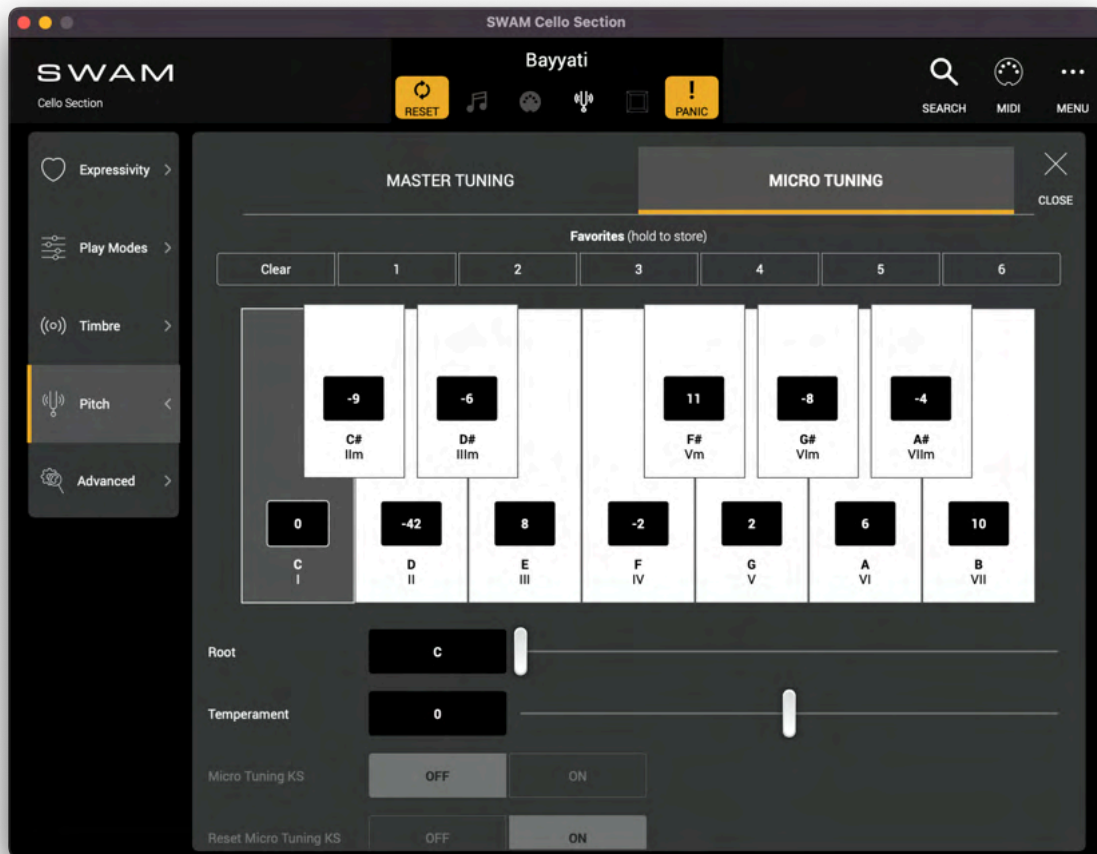
Pitch

Master Tuning



- Master Tune: master tuning of the instrument displayed both in *Hz* and *cents*.
- 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



- **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 slot 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"

- Microtuning KS (Key Switches):
 - OFF: disable key switches for microtuning
 - ON: enable key switches for microtuning
- Reset Microtuning KS:
 - OFF: Microtuning KS activation does not reset or affect current detuning
 - ON: Microtuning KS activation resets the detuning applied.
- Cavit Scale Ultimate (by Cavit Artanlar): enables the "SWAM Microtuning" SysEx protocol, which allows "Cavit Scale Ultimate" iOS app to control microtuning and transposition, and to apply musical nuances typical of Arabic and Eastern music.
- MAQAM (by Mazeka Toys - mazedatoys.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 and Transposition through MIDI SysEx messages. SWAM responds to a few SysEx protocols: SWAM Microtuning protocol, Custom protocol and Yamaha XG arranger protocol.

SWAM Microtuning protocol

Note: Be sure "Cavit Scale Ultimate" switch is set to ON in the Pitch / Microtuning view.

Byte 1 - Beginning of sysex: F0H
Bytes 2, 3, 4 - Audio Modeling Manufacturer ID: 00H 21H 2DH
Bytes 5, 6 - Model ID: 00H 00H
Byte 7 - Command type: 00H (Read), 01H (Write)
Byte 8 - Category: 00H (System)
Byte 9 - Parameter: 00H (Transpose), 01H (Microtuning)
... - Data bytes
Byte N - End of sysex message: F7H

Data bytes

Transpose (1 byte):

Byte 10 - Transposition value in semitones: 00H -> 7FH
 < 40H: negative transposition
 40H: 0 cents
 > 40H positive transposition

Microtuning (3 bytes):

Byte 10 - MIDI note number: 00H -> 7FH
Byte 11 - Sign:
 <= 40H positive
 > 40H negative
Byte 12 - Microtuning value in cents: 00H -> 64H (0 to 100 cents)



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 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 XG arranger protocol

Each message is 9 bytes:

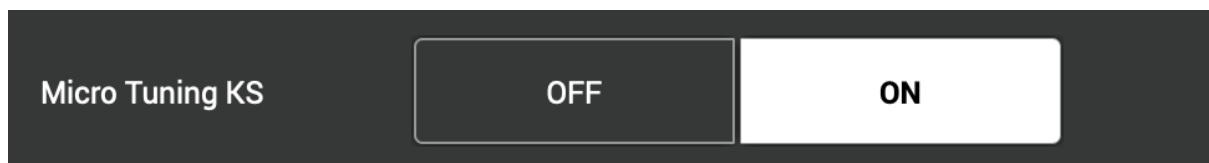
1st byte: Beginning of sysex (F0)
2nd byte: Manufacturer ID - Yamaha (43)
3rd byte: Device ID (values between 0x10 and 0x1F are allowed)
4th byte: Model ID - XG (4C)
5th byte: Address High (08)
6th byte: Address Mid (00)
7th byte: Address Low - Note value (41=C, 42=C#, 43=D, ..., 4C = B)
8th byte: Detuning value (04=-60, 05=-59, 06=-58, ..., 40=0, ..., 7B=+59, 7C=+60)
9th byte: End of sysex (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

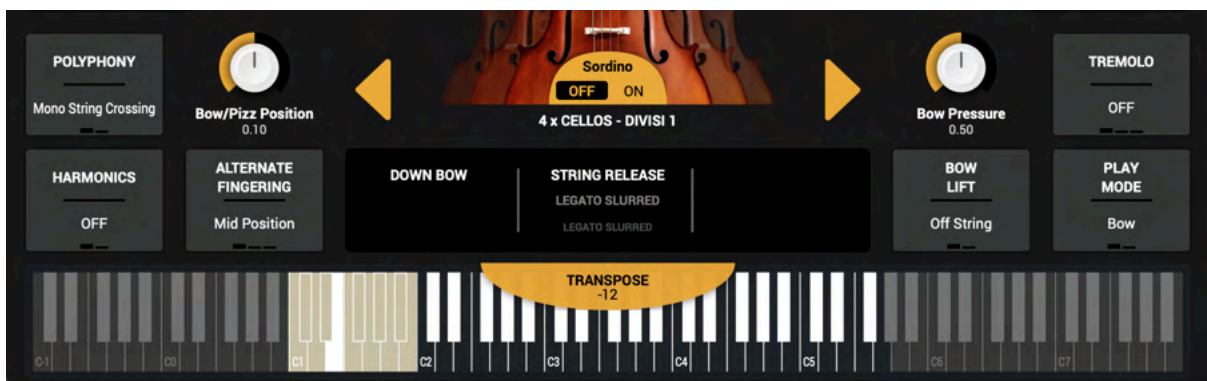
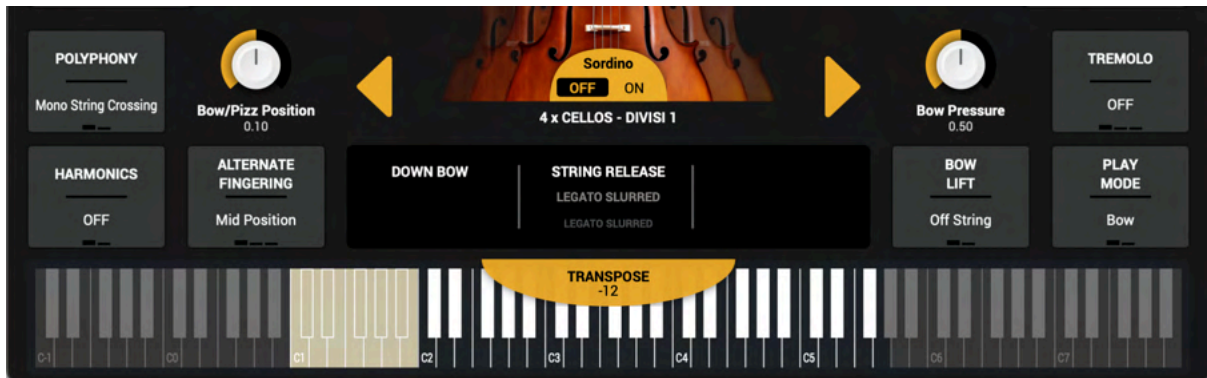
Applying microtuning using key switches

You can also apply microtuning to notes using key switches. To do this you must first go to Advanced -> MIDI and enable the key switches using the "KS Octave" parameter. Then go to Pitch -> MICRO TUNING and set the "Microtuning KS" parameter to "ON".



This parameter can be assigned to a MIDI Control Change. A handy mapping is CC "64", i.e. the Sustain pedal, which is the most suitable option for this task.

When "Microtuning KS" is active, you can press the appropriate key switches that correspond to the notes you would like to detune. For example, by pressing the E1 key switch detuning will be applied to all E notes.



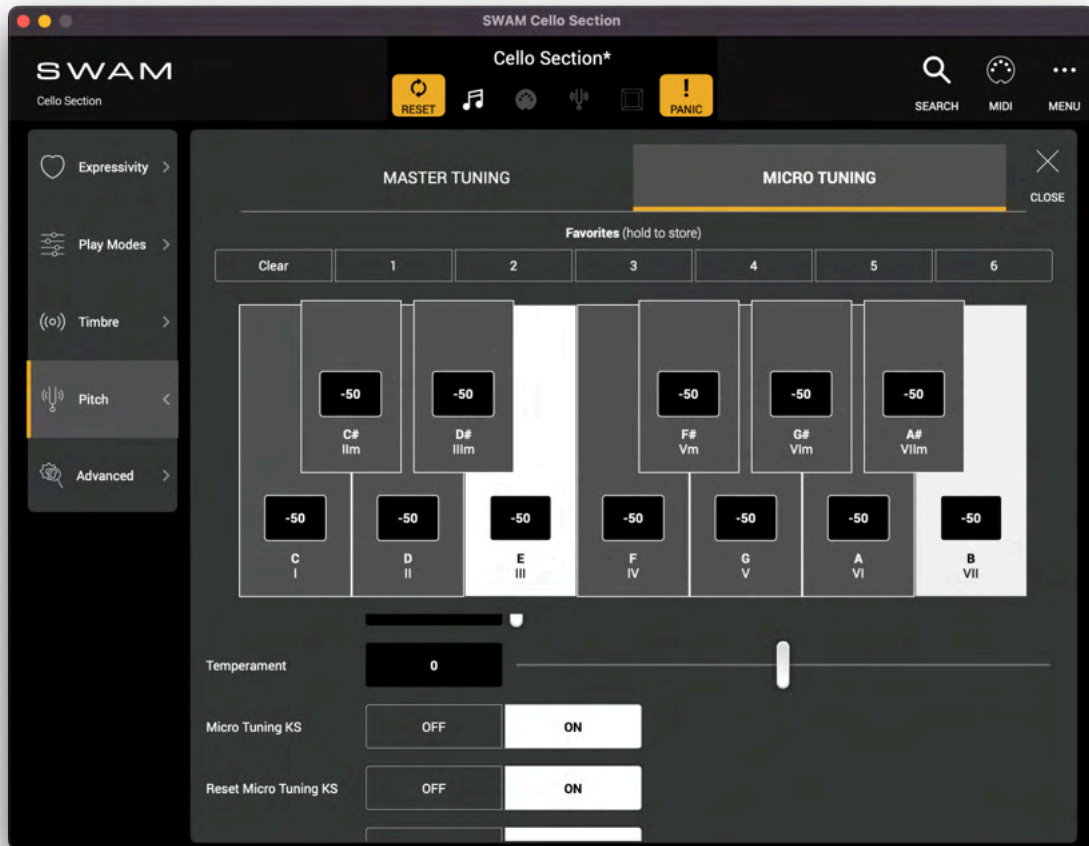
How to detune selected notes

1. Set the "Microtuning KS" parameter ON by pressing and holding down the Sustain pedal (or send a value greater than 64 via the CC you have assigned for Microtuning KS); the key switches will turn light gray.
2. Press any key switches (even multiple at the once) that correspond to the notes you want to detune.
3. Exit "setup" mode by releasing the sustain pedal (or send a value below 64 via the CC assigned for this task).

For example: if you need an Arabic scale in C and want to detune all E and B notes -50 cents, the steps would be:

1. Press and hold the sustain pedal
2. Press E1 and B1
3. Release the sustain pedal

The affected notes and the detune amount is displayed in the Pitch -> MICRO TUNING page.



If the "Reset Microtuning KS" parameter is ON, as soon as you re-enable Microtuning KS (by pressing the Sustain pedal or sending a value greater than 64 via the CC you have assigned for this task), the current detuning of all the notes will be cleared.

Keeping the pedal pressed, you can immediately detune a new set of notes by pressing the appropriate key switches.

This allows you to apply different microtuning scales on the fly.

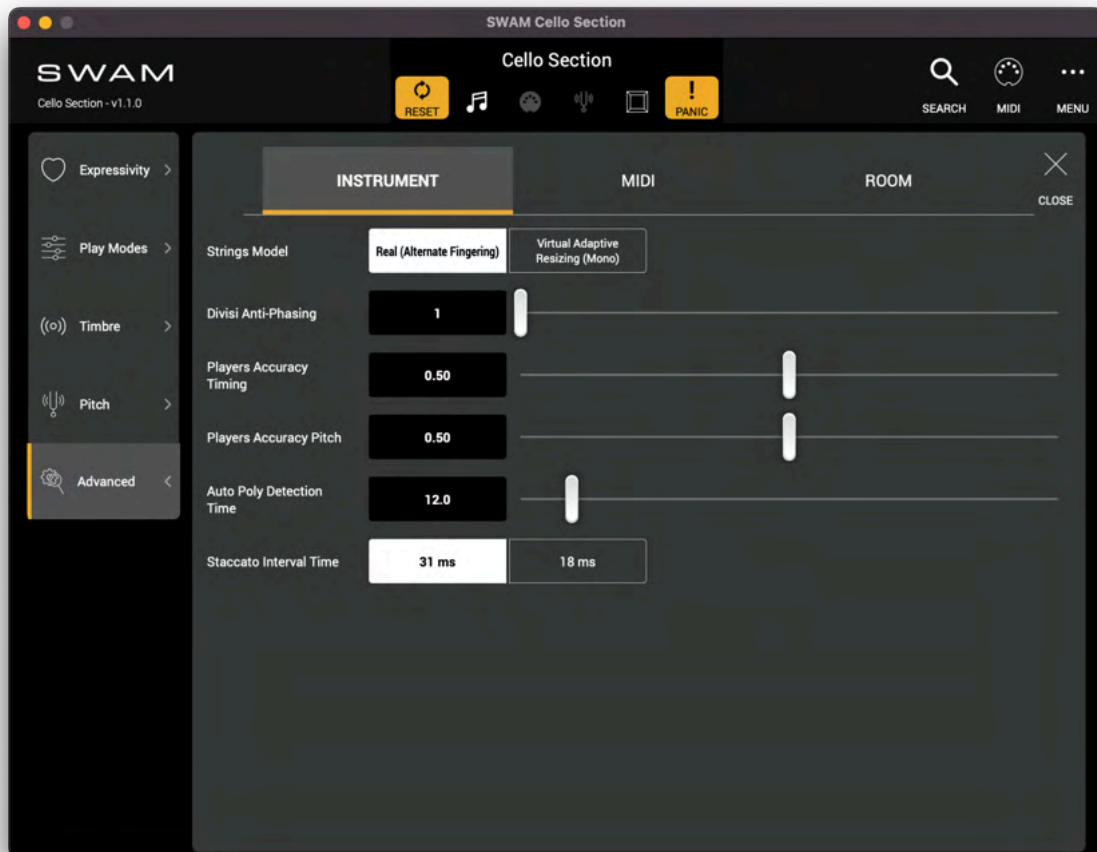
If you don't want to reset the microtuning every time you re-enable Microtuning KS set "Reset Microtuning KS" parameter to OFF.

Microtuning presets

From the Main "..." Menu and Preset Manager it is possible to Save and Recall Microtuning Presets. A list of Factory Microtuning presets is provided.

Advanced

Instrument

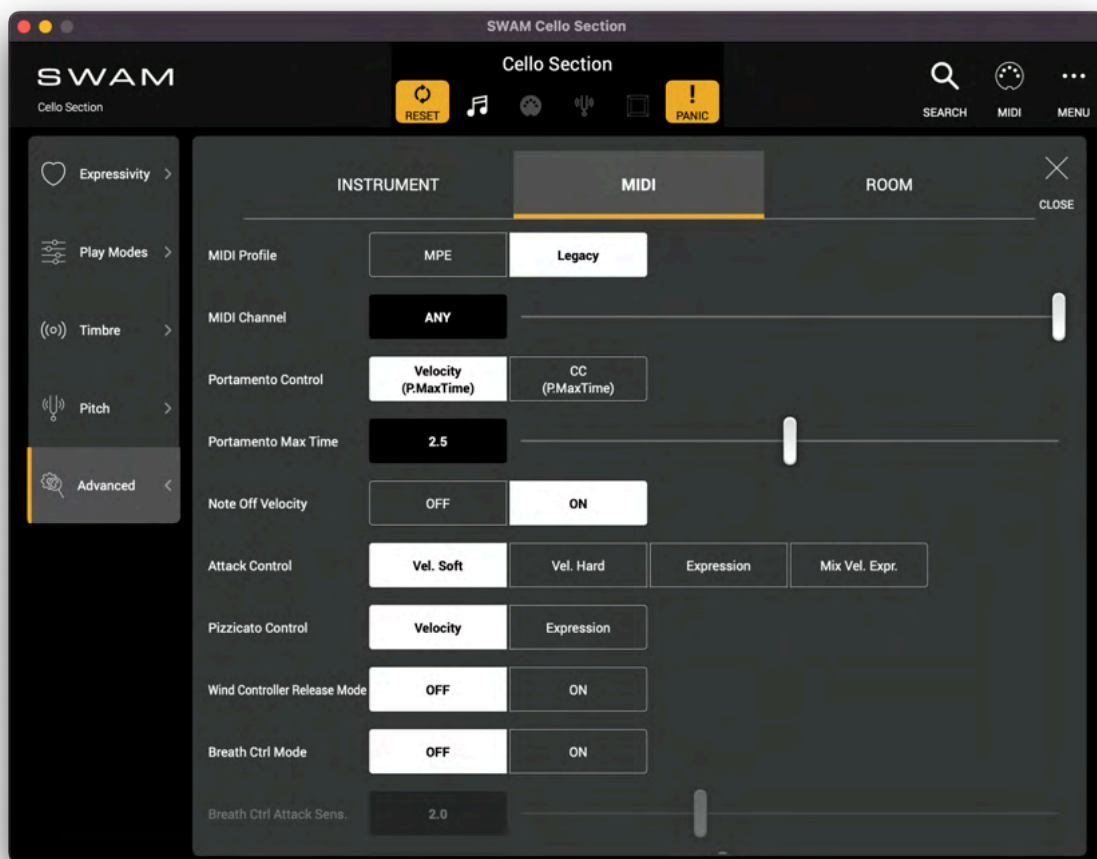


- String Model
 - Real (Alternate Fingering): the model emulates a section of instruments with four strings with fixed thickness and tension.
 - Virtual Adaptive Resizing (Mono): the model emulates a section of instruments with just a single string that ideally has different thickness and tension, depending 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).
- Divisi Anti-Phasing: when placing multiple instances of the same section in the virtual room, it's highly recommended to select a different "Divisi Anti-Phasing" number to avoid phasing artifacts. The selection is normally managed automatically

by the system, but under some circumstances it can happen that multiple sections have the same number; in that case, a warning message is shown. Please assign a different number manually from this screen.

- Players Accuracy Timing: controls the timing precision of the virtual musicians within the same section.
- Players Accuracy Pitch: controls the pitch precision of the virtual musicians within the same section.
- Staccato Interval Time: minimum time separation between a note-off event and a consequent note-on event to be interpreted as “staccato” articulation. 18 ms is suitable for fast staccato notes, but higher execution precision is required.

MIDI

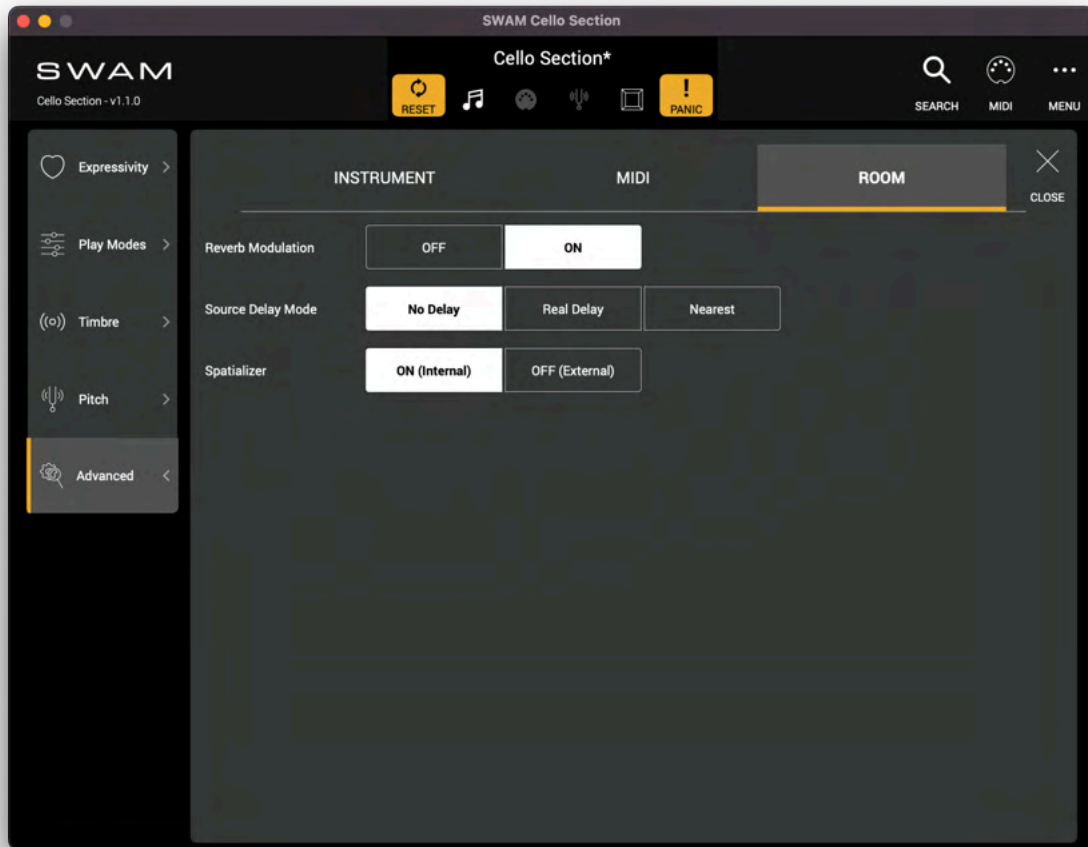


- MIDI Profile:
 - MPE: for MIDI Polyphonic Expression compatible devices.
 - Legacy: MIDI 1.0 devices.
- MIDI Channel: the MIDI channel the sound generator receives notes and controllers that affect the sound (default is ANY). Note that this can be different from Key

Switches MIDI Channel, so it is possible to control Key Switches from a different device on a different Channel. 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).
- Note Off Velocity (if supported):
 - OFF: fixed Note Off velocity at 112
 - ON: get legato retrigger velocity from note off velocity
- 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.
- Pizzicato Control:
 - Velocity: control pizzicato play mode through velocity.
 - Expression: control pizzicato play mode through expression.
- Wind Controller Release Mode: useful especially for handling Wind Controllers, as they send Note Off events when Expression reaches the minimum value.
- 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.

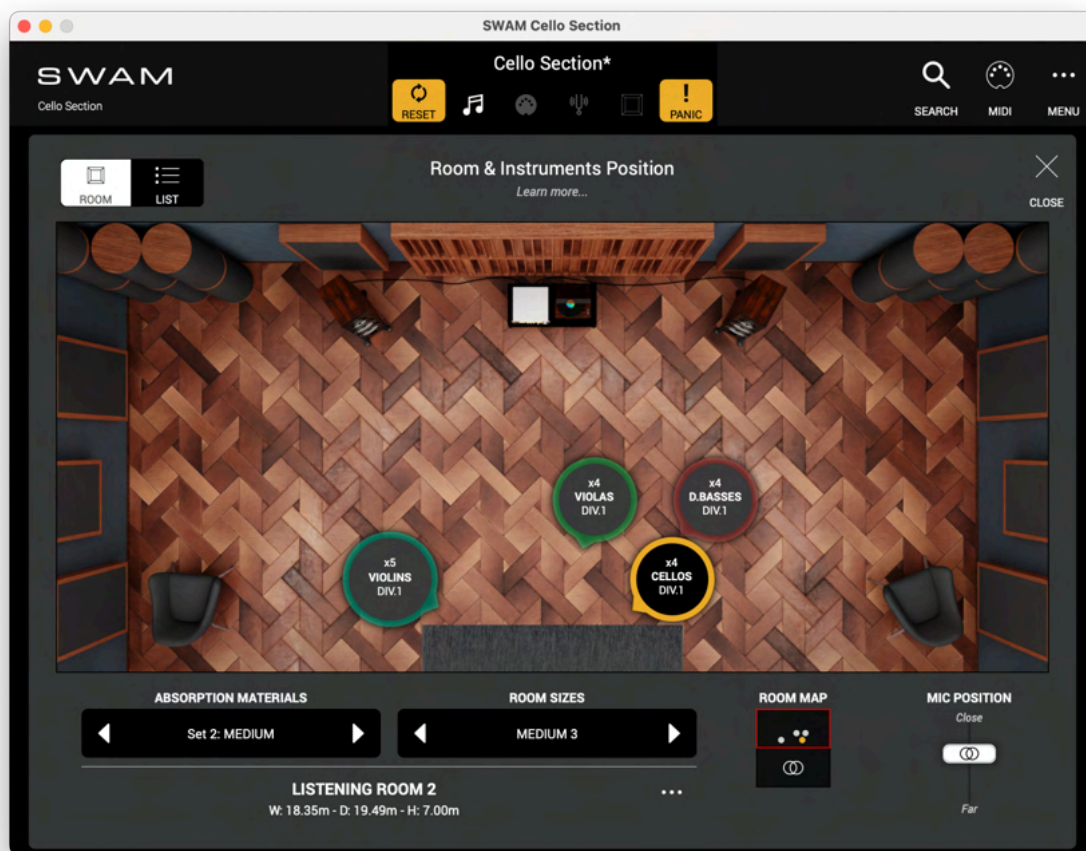
Room



- Reverb Modulation: when set to ON, reverb has a lusher, silky sound, but it requires more CPU power.
- Source Delay Mode: in real acoustic environments sound travels at a given speed, so there is a latency between the sound generation time and the time the sound signal is captured by the microphone (or listener's ears). This applies also to the traveling time of the sound waves reflected by the room surfaces.
Source Delay Mode controls how the sound traveling time is computed.
 - No Delay: to avoid extra latency when playing the section in real-time, direct sound traveling time is ignored. Traveling time of the reflected waves is computed subtracting the direct wave traveling time.
 - Real Delay: direct sound traveling time is not ignored, behaving like in the real acoustic environment. This can lead to latency, when playing the instrument in real-time.
 - Nearest: direct sound traveling time is ignored for the section closest to the microphone only. All other sound wave traveling latencies are computed accordingly.
- Spatializer:

- OFF (Internal) : the internal Virtual Room and Position engine is active. This option is recommended to get the most realistic sound for each section that is located in the same room.
- ON (External): choose this option if you want to use an external spatializer. Be aware that applying ONLY a reverb is not enough to get the same result of a virtual position room simulator.

Room & Position



- Room & Instruments Position:
 - ROOM: show all sections added to the current project placed in a virtual room. The virtual room graphics changes depending on "ABSORPTION MATERIALS" and "ROOM SIZES" parameters. Each section is displayed as a circle (placeholder) with a size that depends on the section size. The actual position of each section can be changed in real-time clicking and dragging each section placeholder.
 - LIST: accessible component. Shows the list of sections added to the current project as pairs of Distance and Angle parameters. This mode has been

added especially for blind and visually impaired users, since it's screen reader friendly.

- Absorption Materials: set the materials of the room surfaces. There are three sets of materials: Set 1: HIGH, Set 2: MEDIUM, Set 3: LOW.
- Room Sizes: set the room size. There are six room sizes available: MEDIUM 1, MEDIUM 2, MEDIUM 3, LARGE 1, LARGE 2, LARGE 3.
- Mic Position: distance of the virtual stereo microphone from the conductor position.

The combination of "Absorption Materials" and "Room Sizes" determines the room type, from a small absorbing studio to a large reflective church.

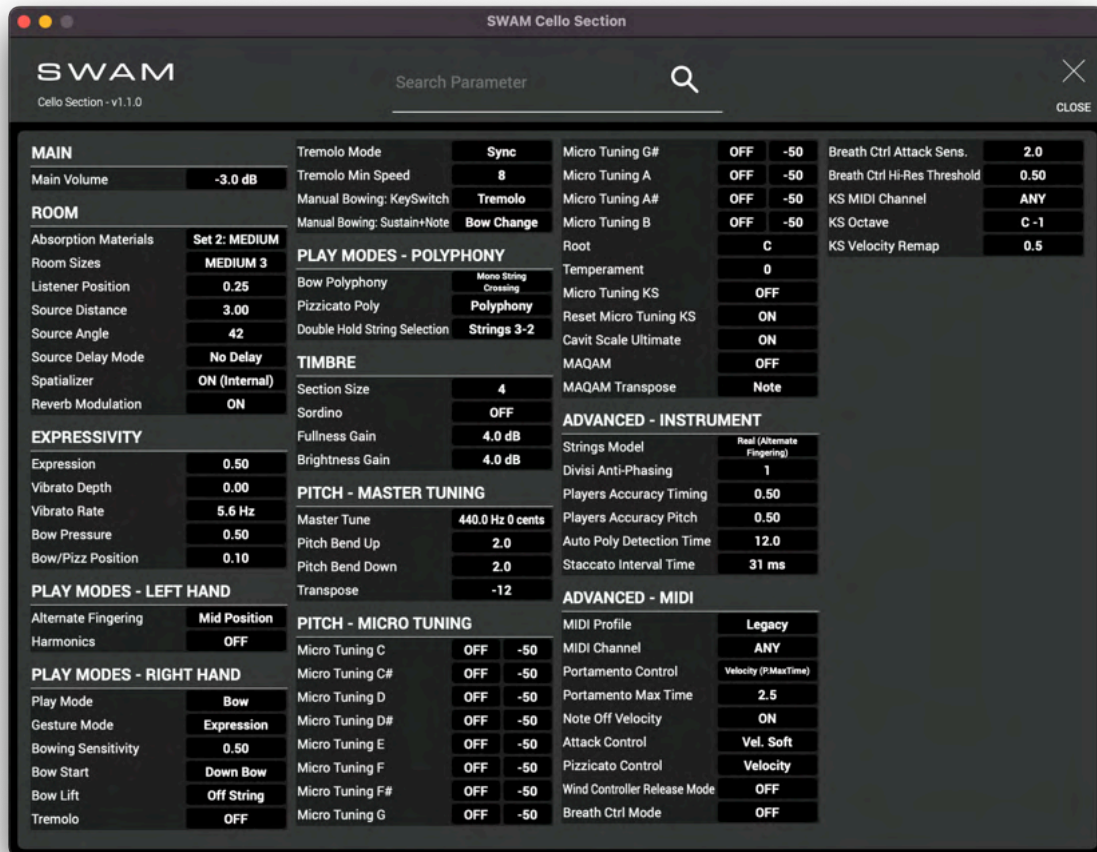
For your convenience, the name of the resulting room type, and its exact sizes are displayed below the "Absorption Materials" and "Room Sizes" selectors.

A handy way to select a given room type is by clicking on the contextual "..." menu next to the room name.

Room presets

From the Main "..." Menu and Preset Manager it is possible to Save and Recall Room Presets. A list of Factory Room presets is provided.

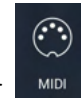
Search



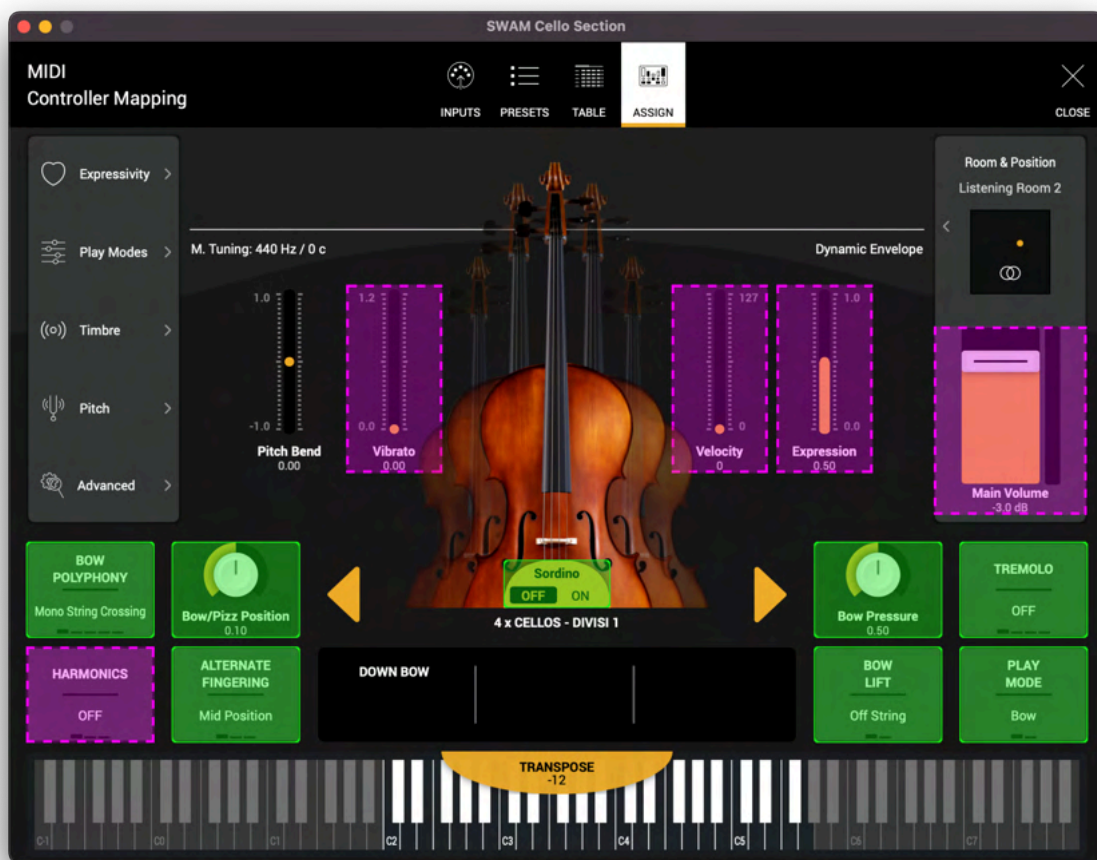
The Search view has been created to improve the experience to beginners, experts and visually impaired users. . Beginners can find any parameter by a handy search feature without the need to browse all sections. For expert users, it offers a streamlined page where all parameters can be easily located, viewed and compared, to have the big picture of the sound engine. Simultaneously, it is designed to be accessible, compatible with screen readers, facilitating seamless navigation for users who are blind or visually impaired. The "Search Parameter" field allows users to highlight only those parameters containing the entered text. This feature ensures that, when using a screen reader, only the relevant parameters are vocalized by the text-to-speech synthesis.

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. By default, the "ASSIGN" mode is selected.

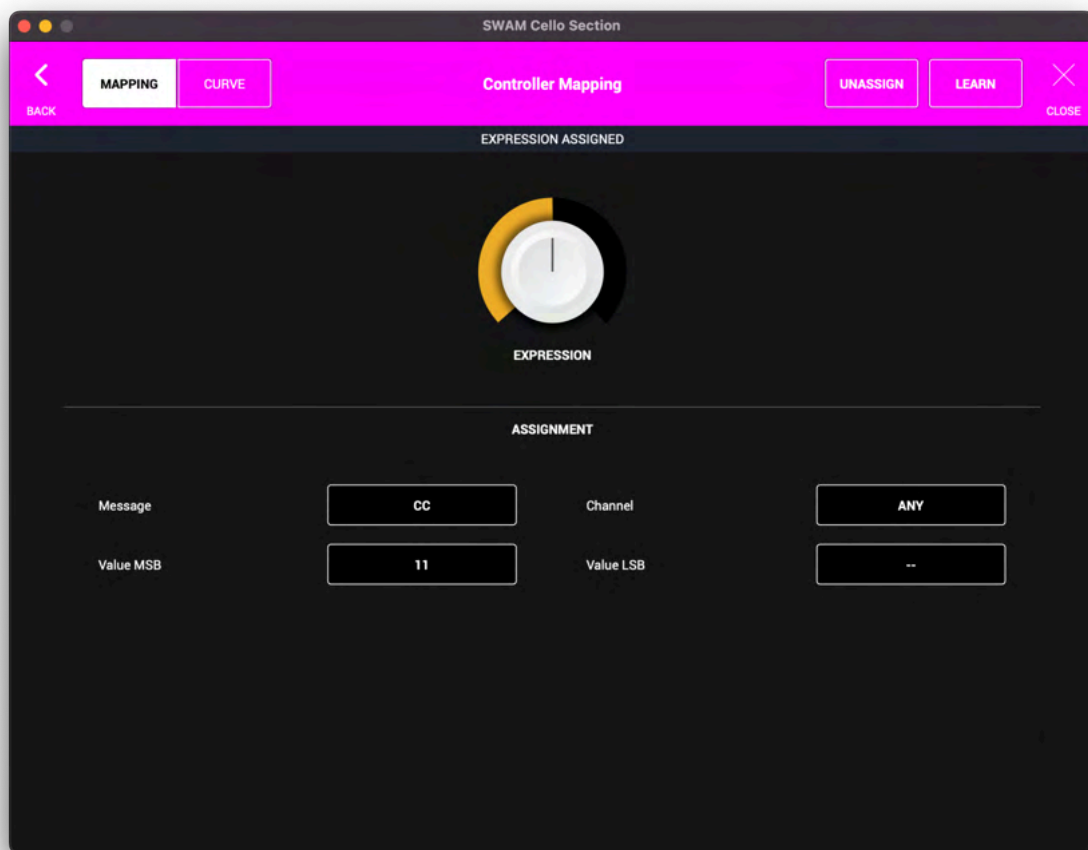


In this view/context, the parameters assigned to a controller are highlighted with a purple area with dashed borders; parameters which are not assigned are highlighted with a green area. Parameters not highlighted are not available for mapping. It is possible to browse the entire interface in this mode 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 “TABLE” button in the top header to access the complete 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 / Close” 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.

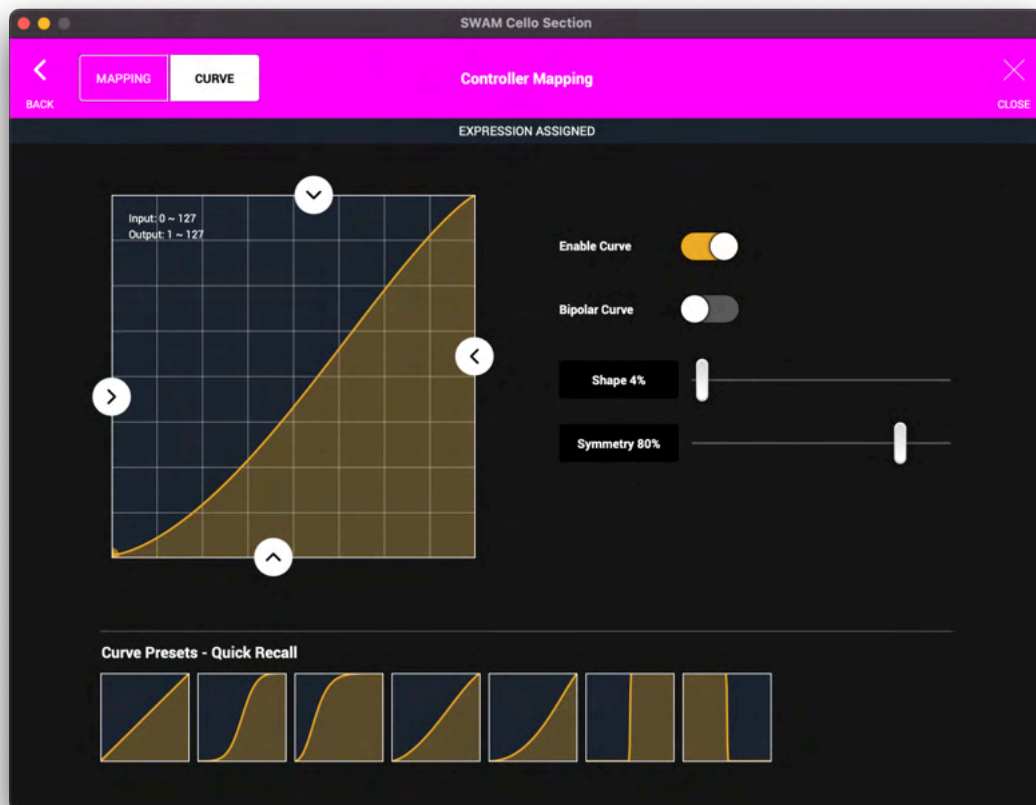
- X / Close: close the mapping screen and turn off the MIDI Mapping Mode.
- ASSIGNMENT section:
 - Message: MIDI message type:
 - CC: Control Change (1 byte value).
 - CC-HIRES: two coupled Control Change messages, MSB and LSB.
 - After Touch: Channel Pressure or AfterTouch messages (1 byte value).
 - NRPN: Non-Registered Parameter Number (CC99, CC98).
 - Channel: determines what MIDI channel this controller will be affected by, from 1 to 16, or ANY.
 - 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 representation of 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 representation of 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 behavior 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.
 - **Enable Curve**: turn on / off the remapping function.
 - **Bipolar Curve**: useful for "bipolar" controls, i.e. where 64 is considered the "zero" of the controller. The parameters of the remapping curve are referred to just one side and then applied to the "negative", antisymmetric side. Bipolar Curve is mandatory for the Expression parameter in case "Bipolar" is selected for the "Gesture Mode" parameter.
 - **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 shape.



Important note for Expression remapping

“Pianissimo” dynamics are faithfully modeled. An important thing to note is that in real life it’s impossible to fade from/to nothing. There is always a small gap between silence and the sound generation.

For this reason, in SWAM String Sections there are four “pianissimo” conditions, depending on the minimum MIDI value of Expression (when the remapping curve is disabled or linear):

- Expression value = 0 or 1: bow speed is so low that friction makes the bow stop. No sound is produced.
- Expression value = 2: bow speed is still slow, but the string can barely vibrate. A scratchy sound is produced.
- Expression value = 3: bow speed overcomes the bow/string friction. A clean sound is produced.

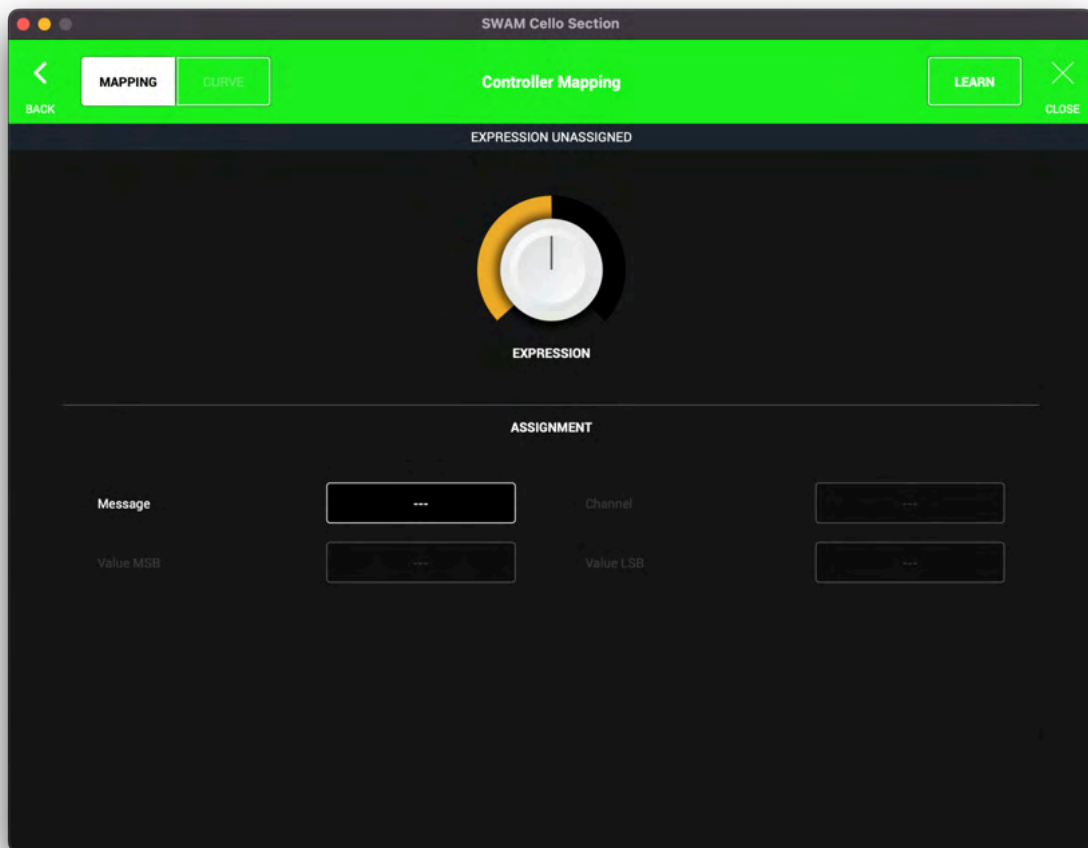
With this in mind, it’s possible to act on the minimum value of the remapping curve to set the desired behavior when the input MIDI value for the Expression parameter is zero. Each curve has a different function, so be sure the output expression value reflects your desired result. As an example, check the the following minimum value (bottom handle) given for a linear remapping curve:

- 1) value = 3: clean pianissimo sound, bow doesn’t stop;
- 2) value = 2: scratchy sound. This value should be used for transitions from / to zero only (i.e. we recommend to avoid setting the minimum remapping value to 2);
- 3) value = 1: sound produced when the Expression value increases and exceeds 2; sound stops when the Expression value decreases below 1;
- 4) value = 0: sound produced when the Expression value increases and exceeds 3; sound stops when the Expression value decreases below 2;



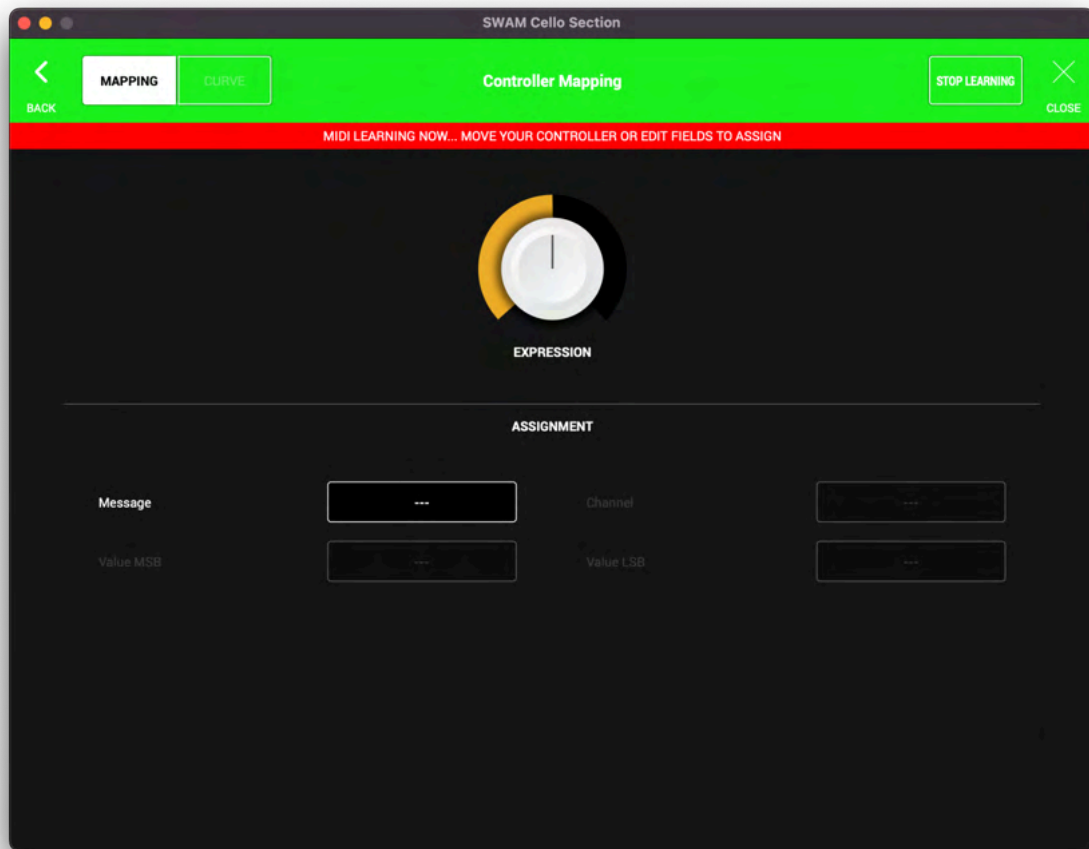
Unassigned parameter status

Any click on an unassigned parameter goes to this screen.

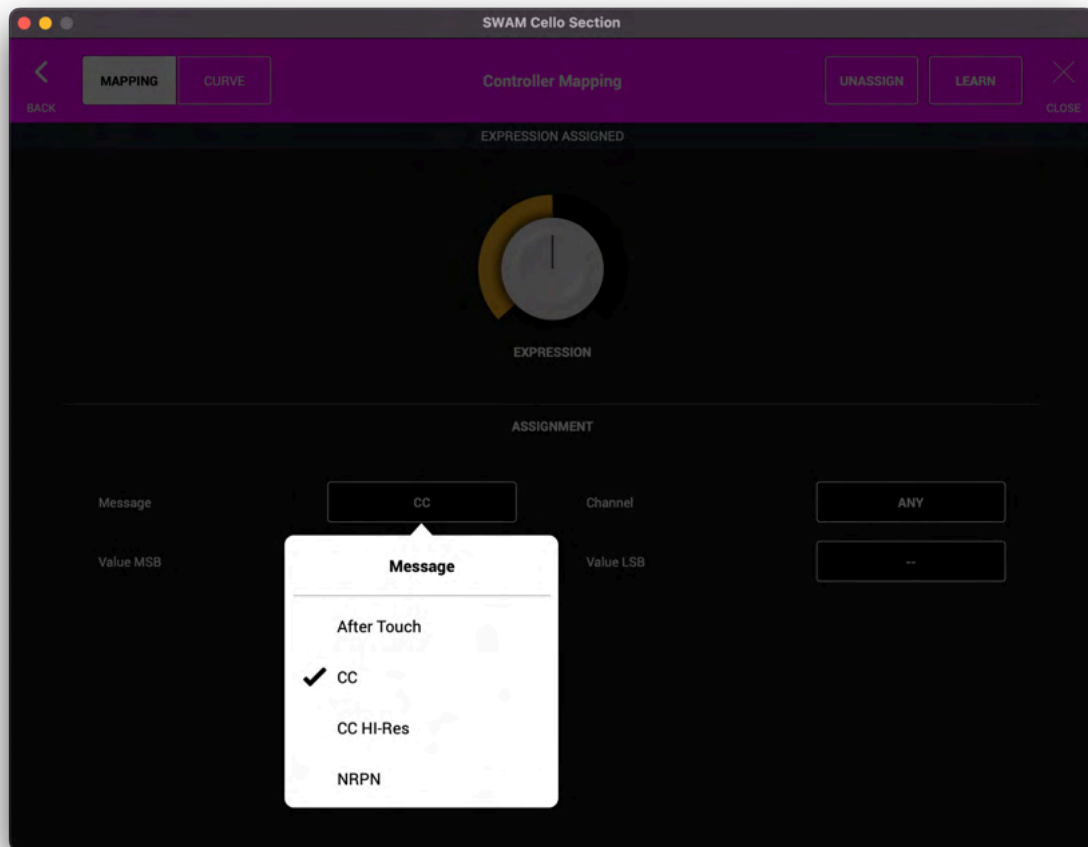


If "LEARN" is active, SWAM automatically listens for MIDI input messages while in LEARN MODE. Move the controller you want to connect to automatically complete the mapping.

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





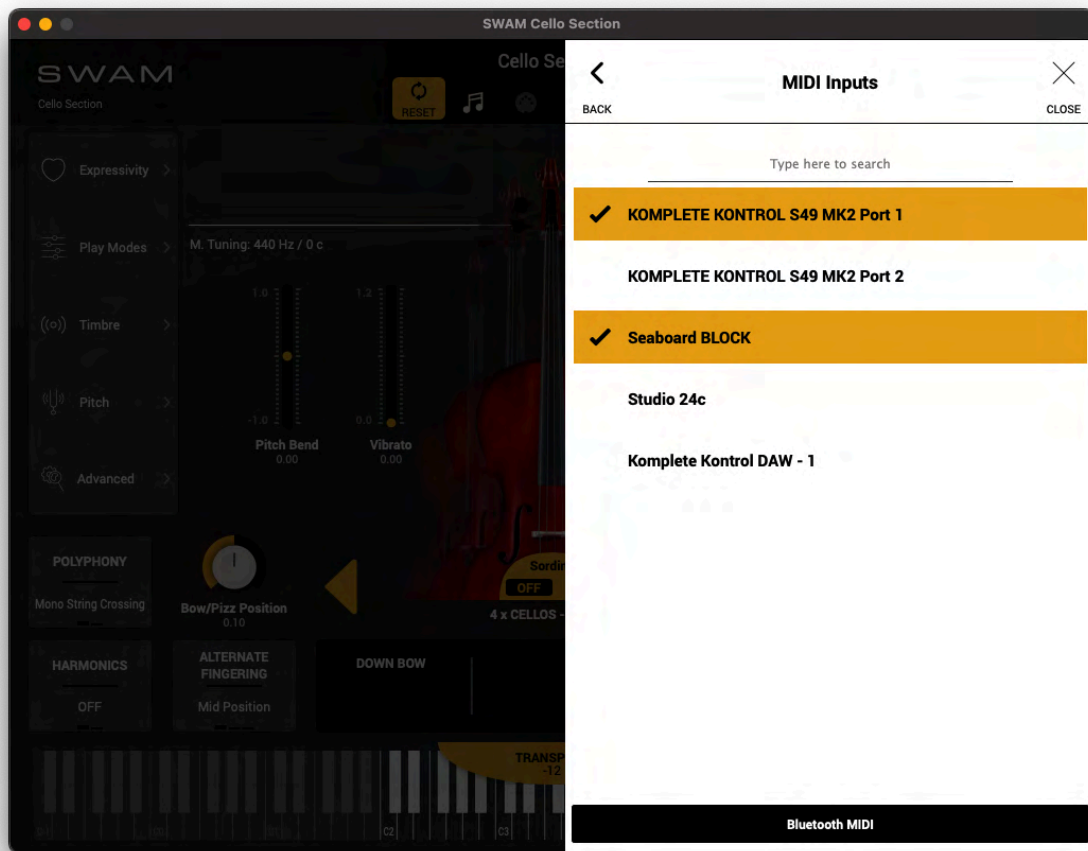
The list of values of the “Message” parameter can be accessed with a long press gesture (click & hold).



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 



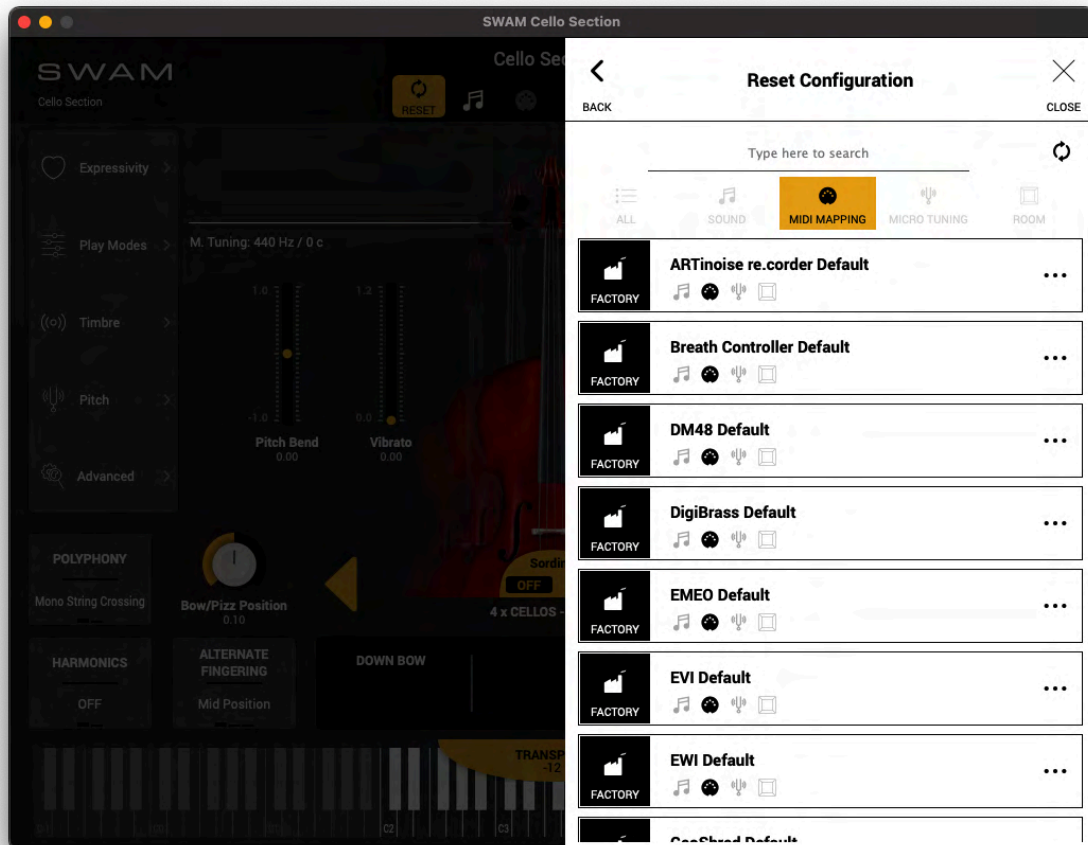
Note: the MIDI Inputs panel shows up automatically at startup, if no MIDI Input has been selected before or if any previous connection has not been found.

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 .



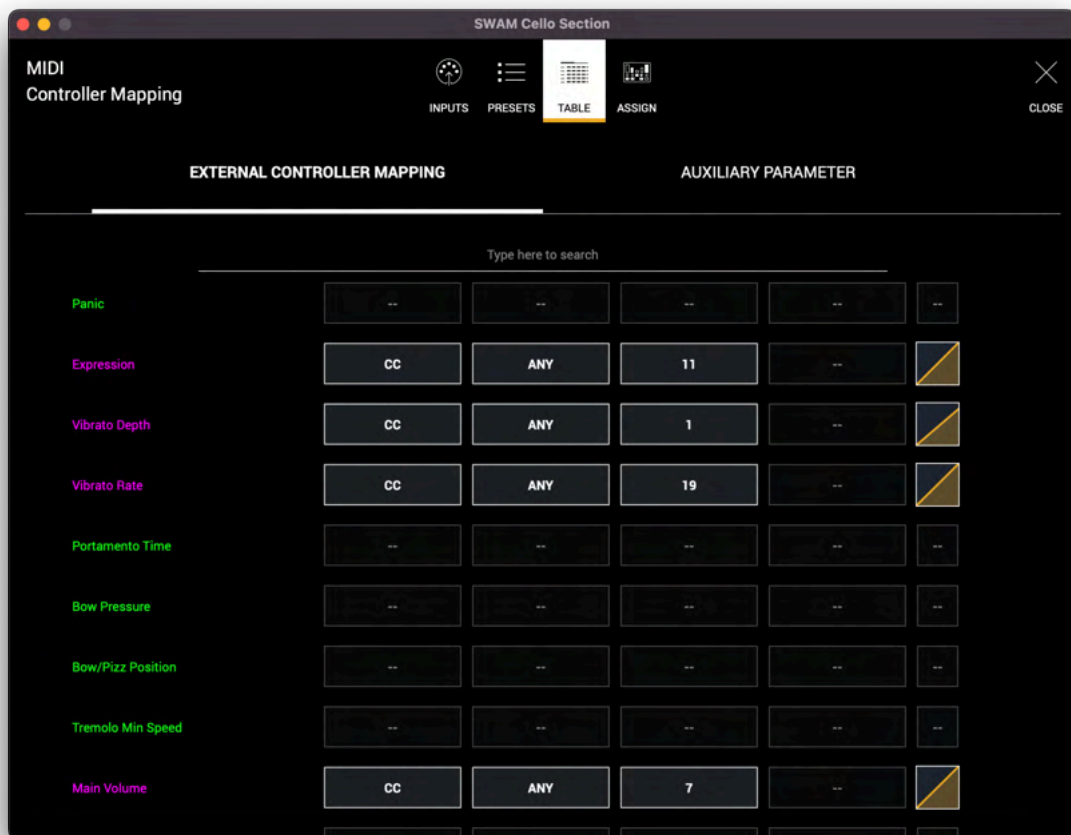
These entries allow us to recall predefined sets of assignments without impacting on the Sound parameters. This is useful when switching between different physical MIDI controllers without losing the timbre and sound behavior obtained acting on the Sound parameters. A list of Factory presets for the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

MIDI Mapping List

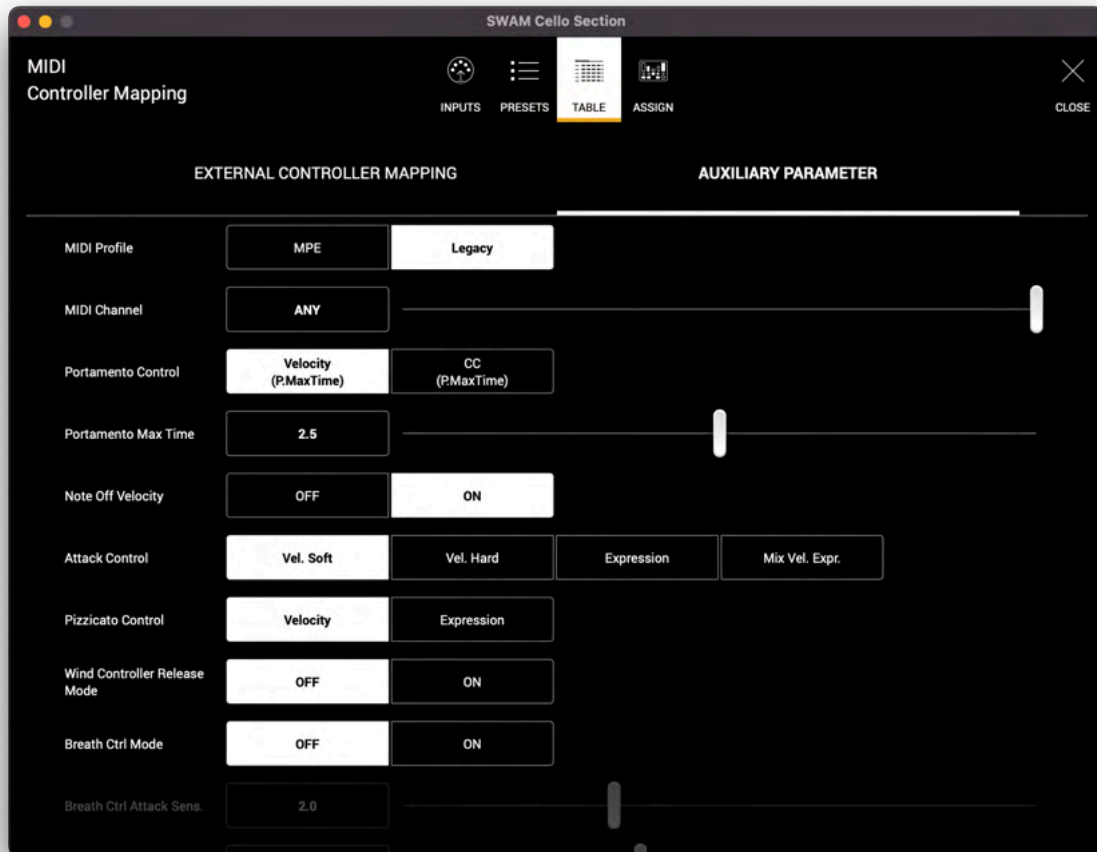
The “MIDI Mapping List” screen recaps all the mapping settings, providing the big picture of all mappings and the configuration of auxiliary parameters.

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.

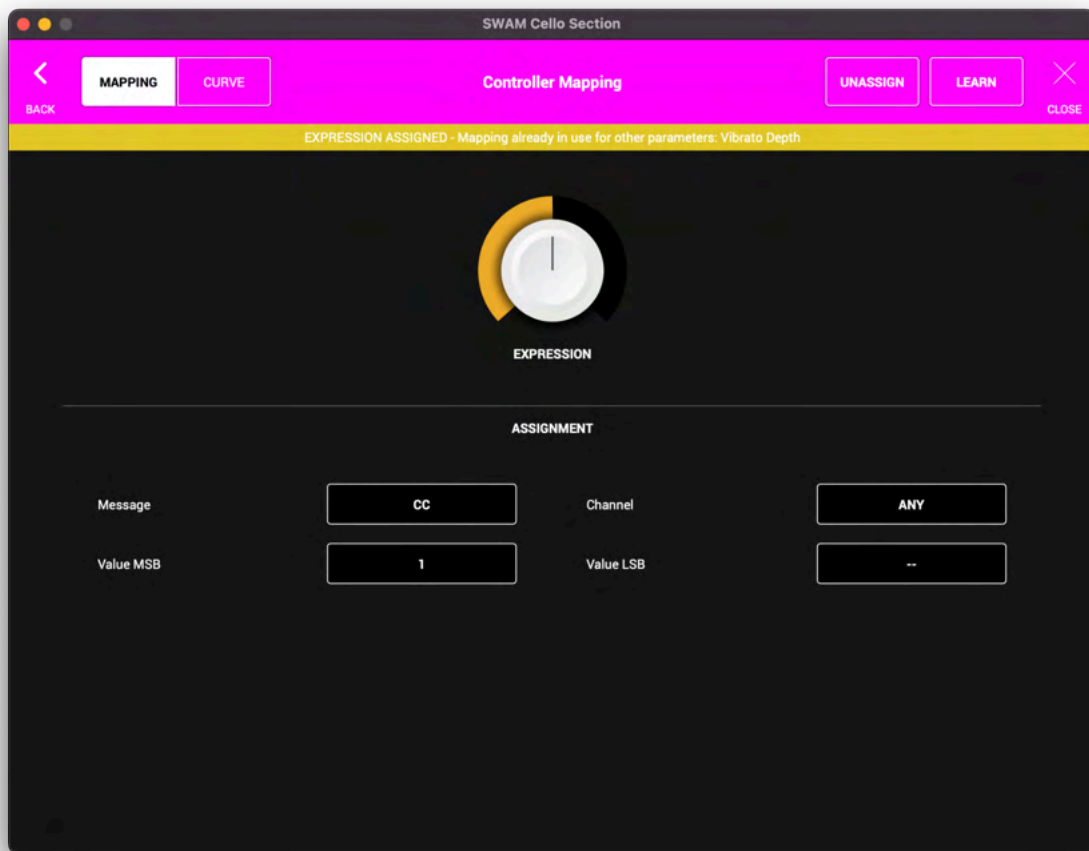


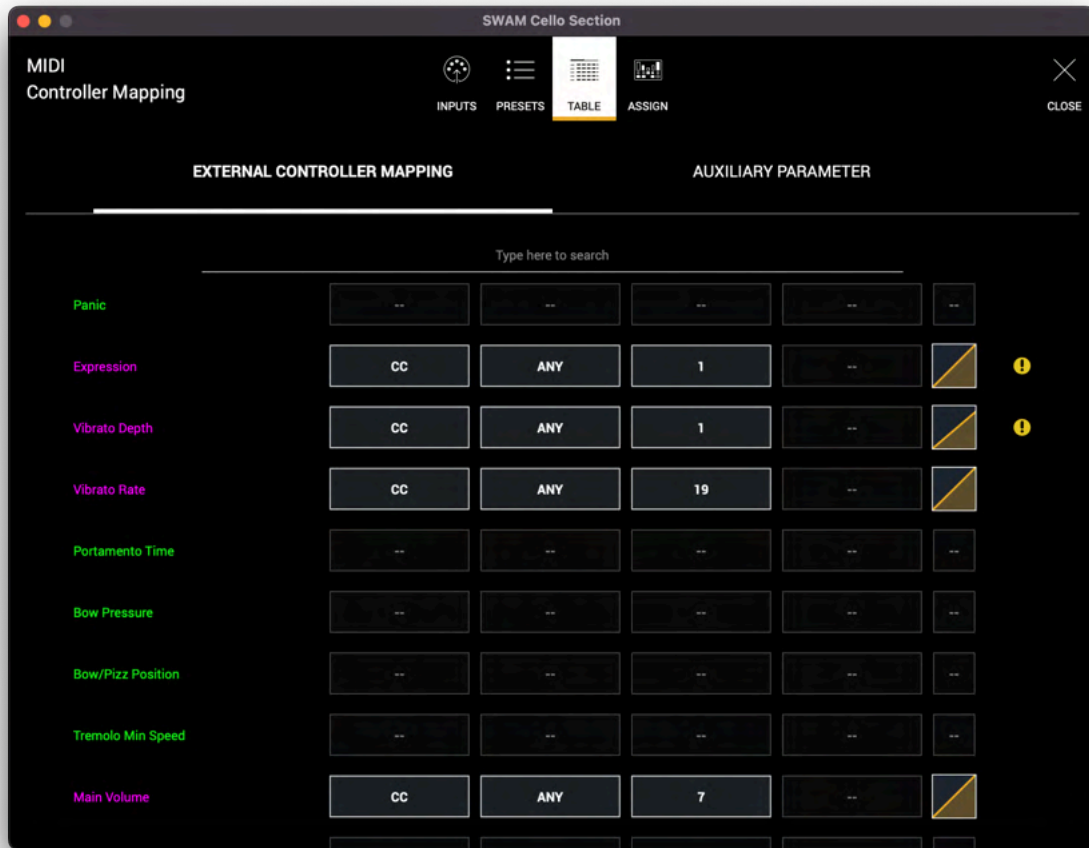
- Auxiliary Parameters: settings and parameters that have a key role in managing the sound engine's response to different controllers. Most of the entries can be found in the "Pitch" and the "Advanced | MIDI" sections as well. These parameters are saved along with the External Controller mapping entries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



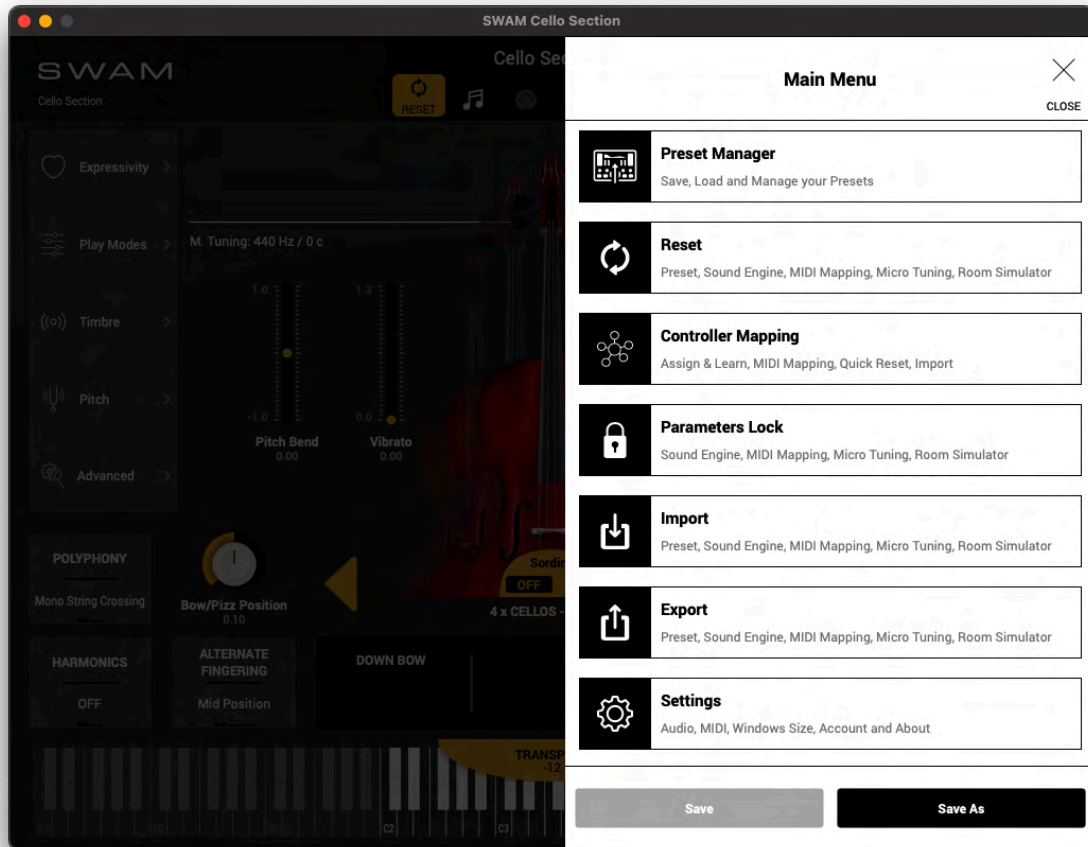
When editing the midi mapping, the system runs a check if the external control (for example a CC message) is already assigned to map another parameter. This check, in case of multiple assignments, shows a warning message displaying a yellow header in the parameter screen ("Mapping already used for other parameter(s)") and a yellow icon on the MIDI Mapping List summary screen.

This warning message is displayed to help avoid unintended multiple assignments, but multiple assignments are allowable and will function, should you have a need to make them. In that situation, simply disregard the warning.





Main menu

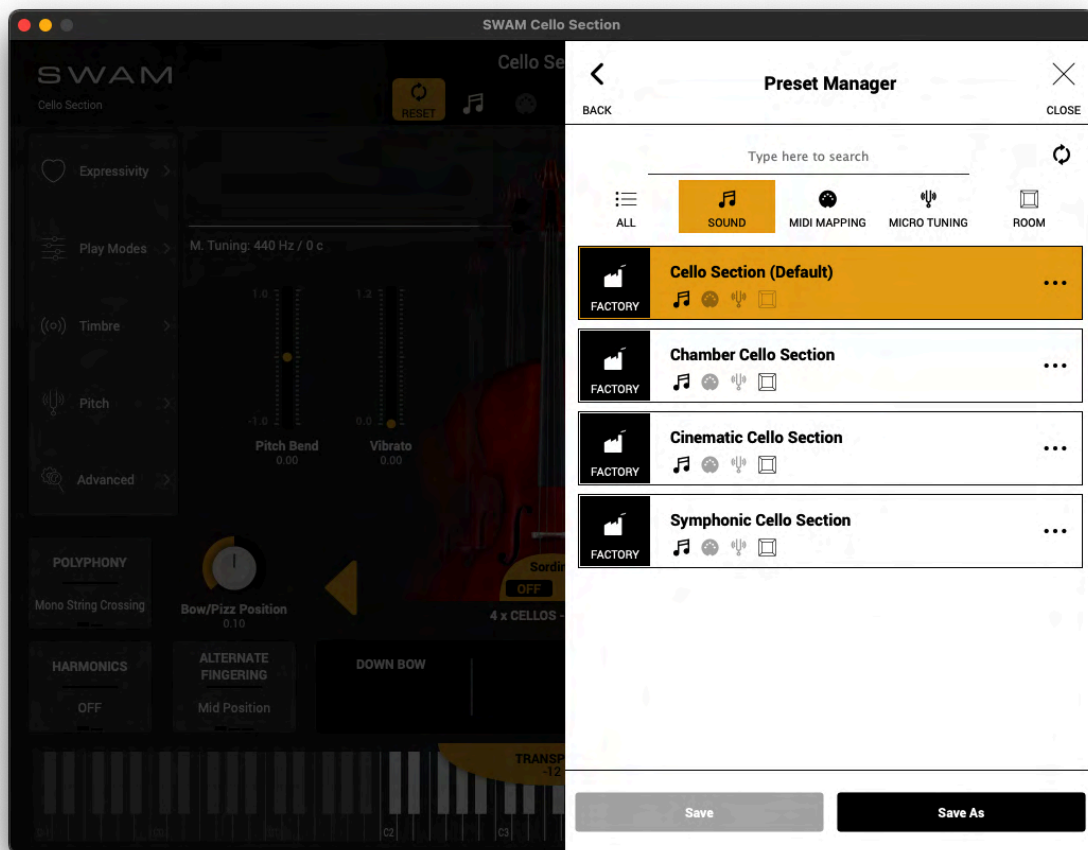


The Main Menu is available when clicking on the top-right  icon.

- Preset Manager: 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
 - Room Simulator: reset or load Room Simulator parameters
 - Section Position: reset to the default section position
- 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
 - Room Simulator Settings: keep the same room simulator settings with different Presets
- Import:
 - Preset: load whole *.swam* preset file
 - Sound Engine Parameters: load a sound settings
 - MIDI Mapping: load MIDI mapping settings
 - Micro Tuning: load micro tuning settings
 - Room Simulator: load room simulator settings
- Export:
 - Preset: save the current instrument state as a *.swam* preset file
 - Sound Engine Parameters: save only sound engine parameters settings
 - MIDI Mapping: save only external controller settings
 - Micro Tuning: save only micro tuning settings
 - Room Simulator: save only room simulator settings
- 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).
 - Options: shows a list of global settings for the application or plugin
 - Accessibility: Settings and Keyboard Shortcuts
 - 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

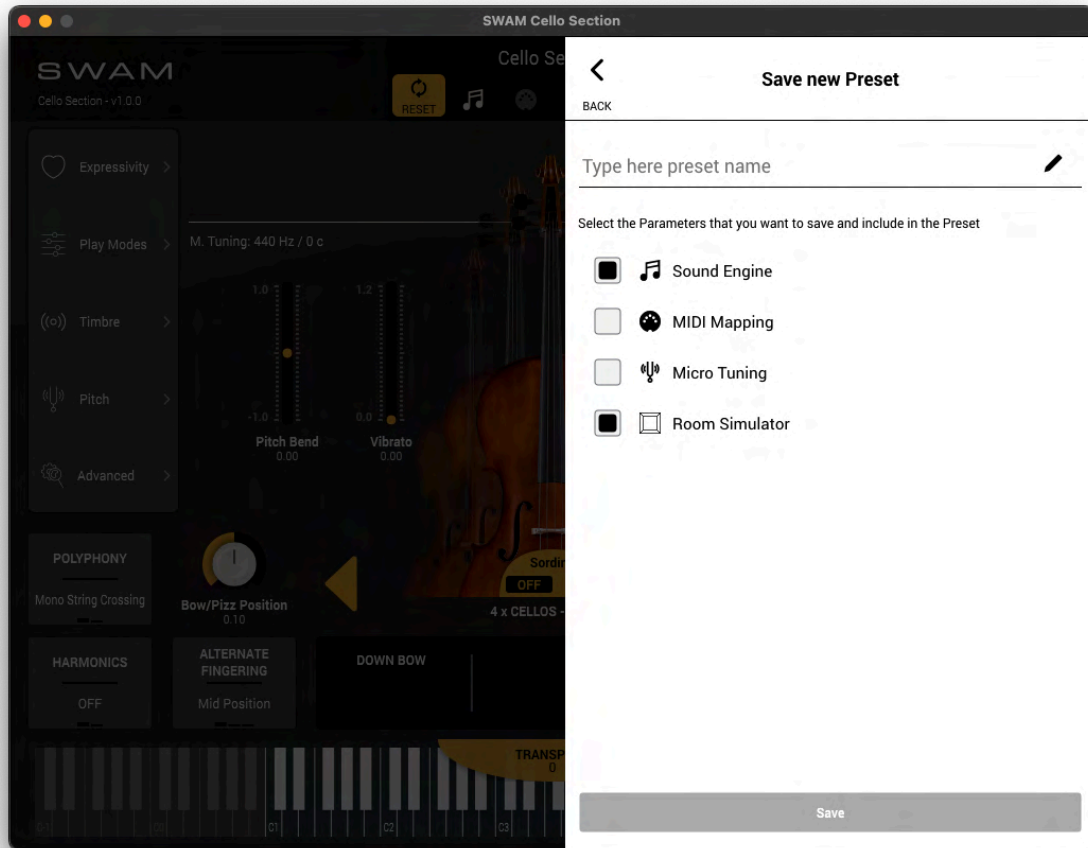
Preset Management



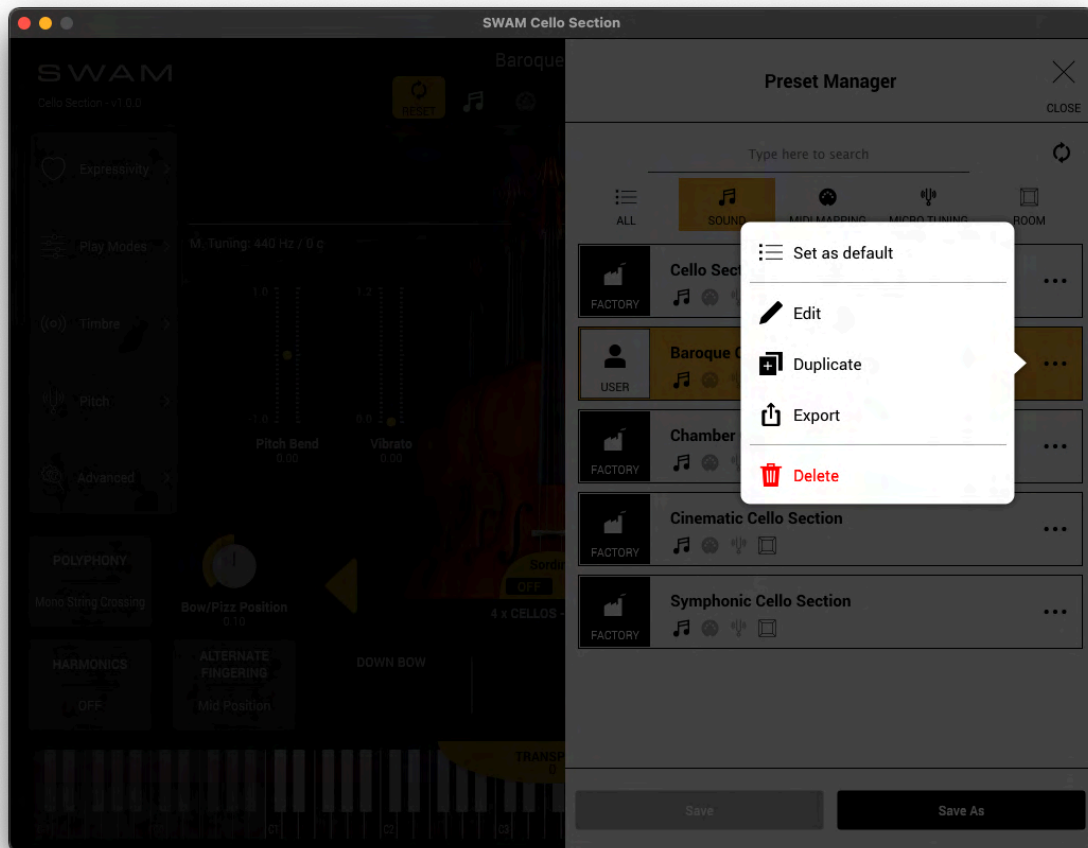
SWAM presets are organized into 4 groups: Sounds, MIDI Mapping, Micro Tuning and Room. User presets can be added, edited and deleted. Factory presets cannot be edited or deleted; any "Save As" action performed on a Factory preset generates a User preset.

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, Micro Tuning and Room Simulator settings. From this menu, it's possible to choose the group of parameters that you want to include in the SWAM preset.

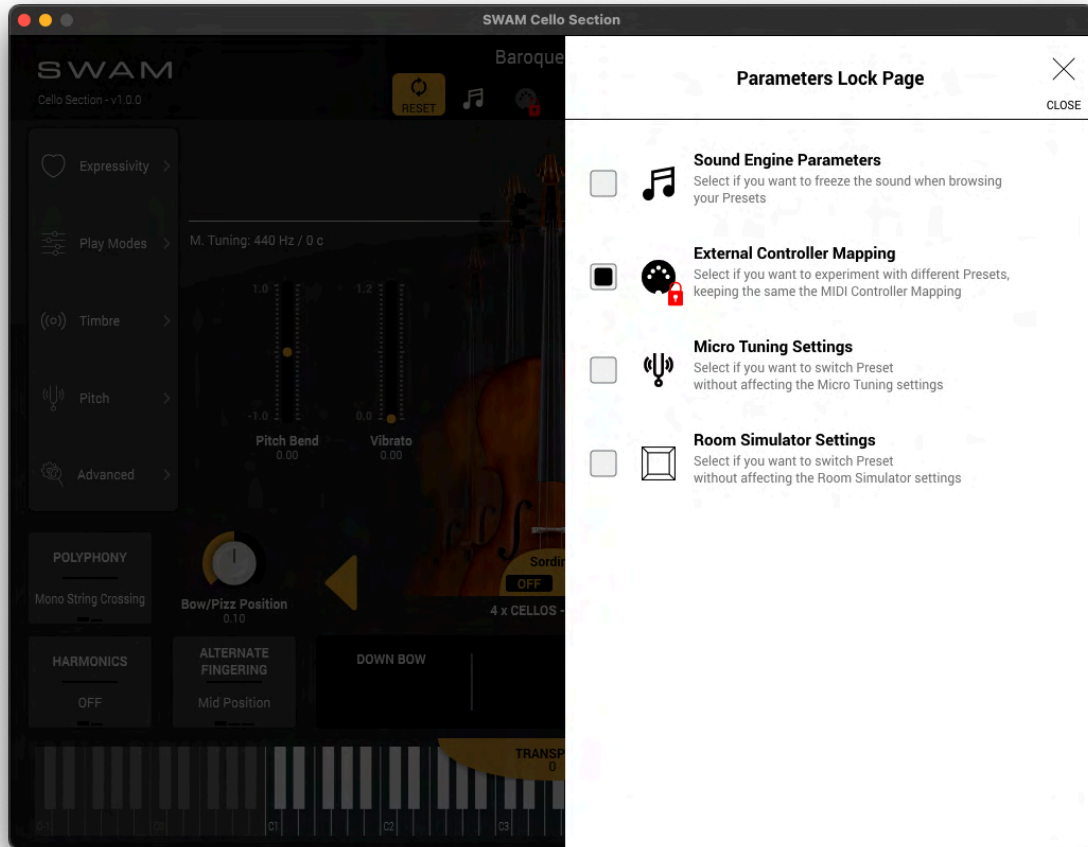


- Edit: edit current preset.
- Duplicate: duplicate current preset to create a new one.
- Export preset: export current preset.

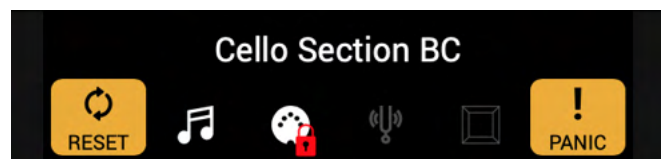
NOTE: compatibility of preset exports with future releases is not guaranteed. It is strongly recommended that users archive custom presets in a custom folder at a different location to the default preset folder.

- Delete: delete the user-selected preset.

Parameters Lock



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



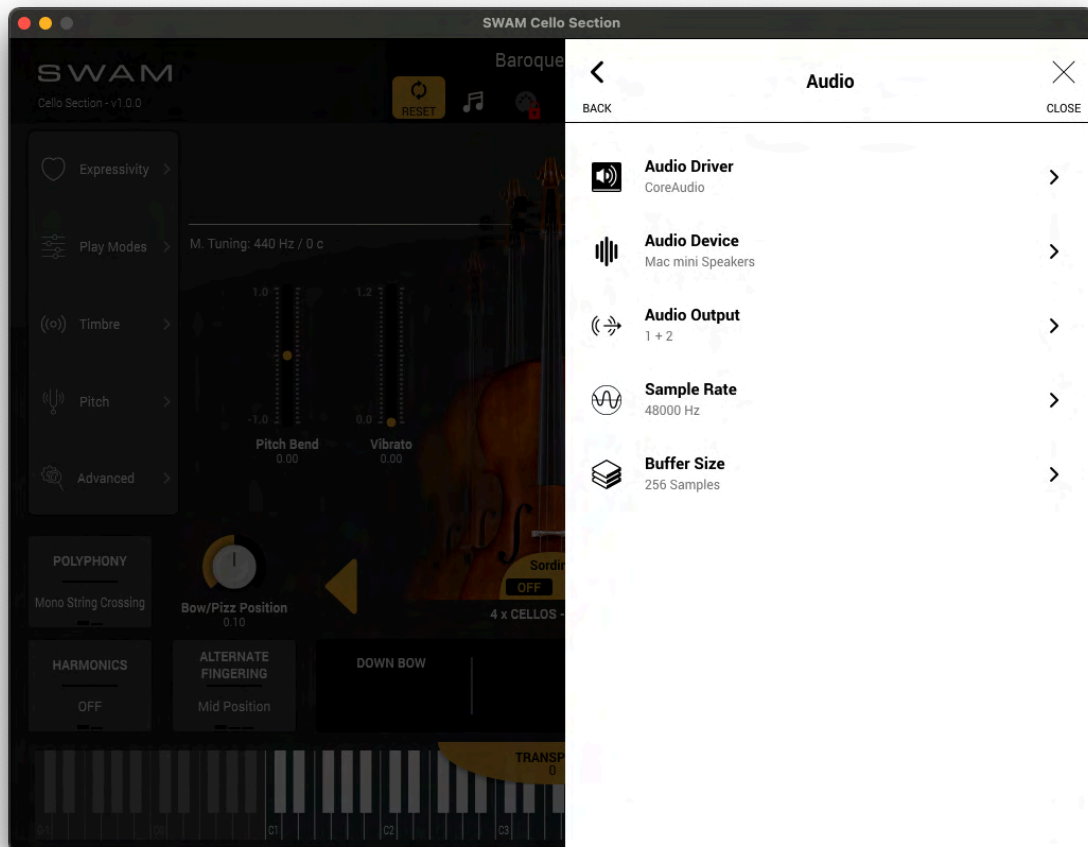
Switch presets without affecting the category of parameters that is locked.

- 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

- Select “Room Simulator Settings” if you want to switch presets without affecting the room simulator settings

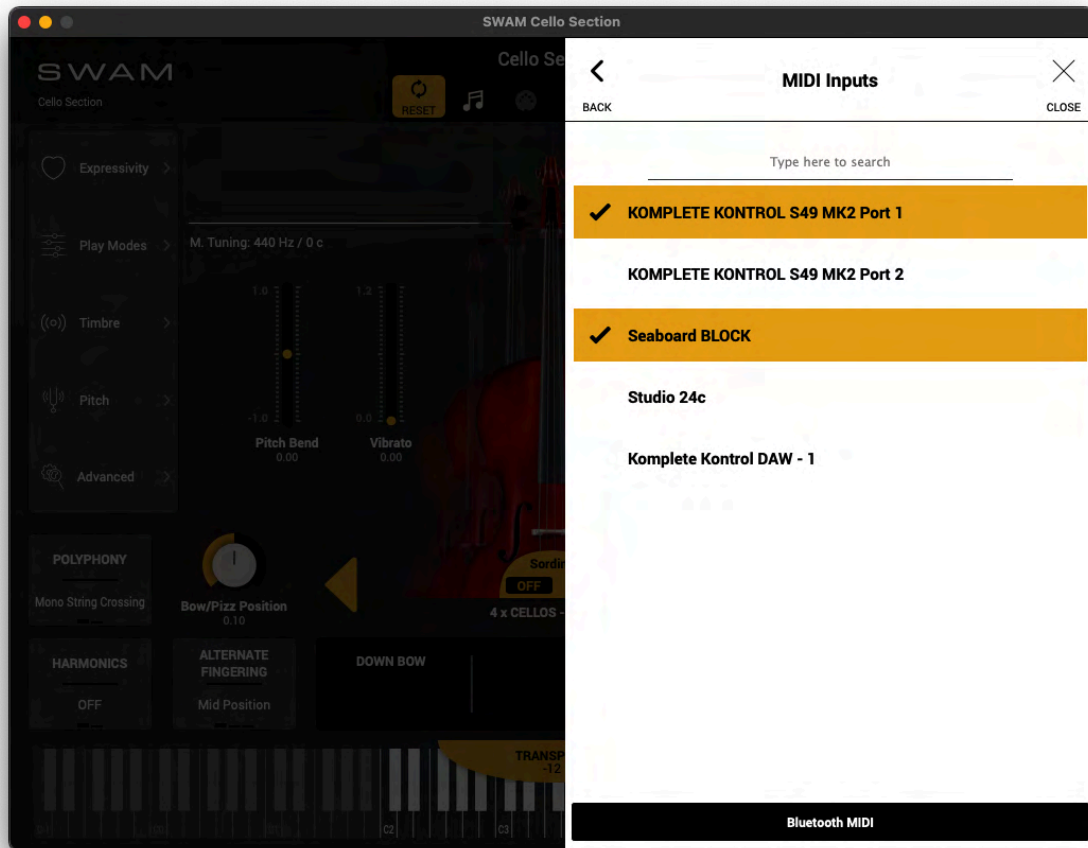
Settings

Audio Settings



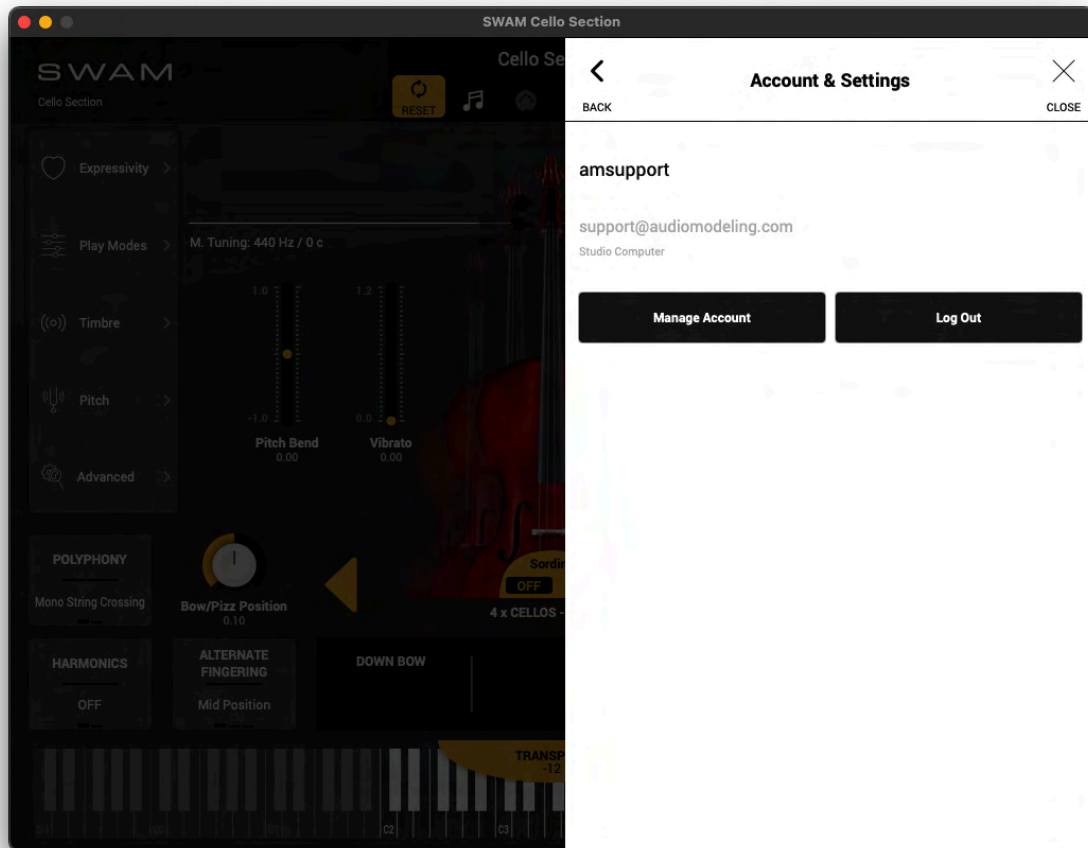
The Audio Settings page is available for the Standalone version only and allows to select the proper Audio device, Output port, Active channels, Sample Rate and Buffer Size. For real-time playing, a combination of Buffer Size and Sample Rate should provide a maximum latency of about 10 ms.

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".

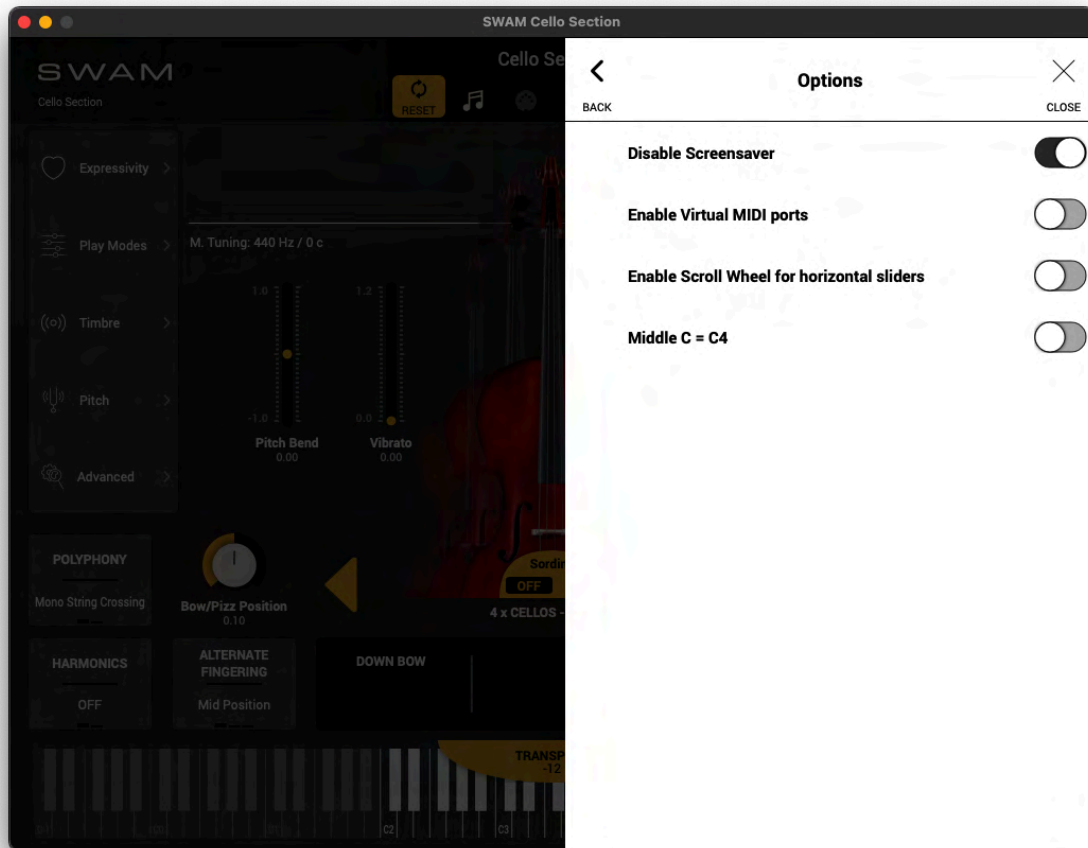
Account & License



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

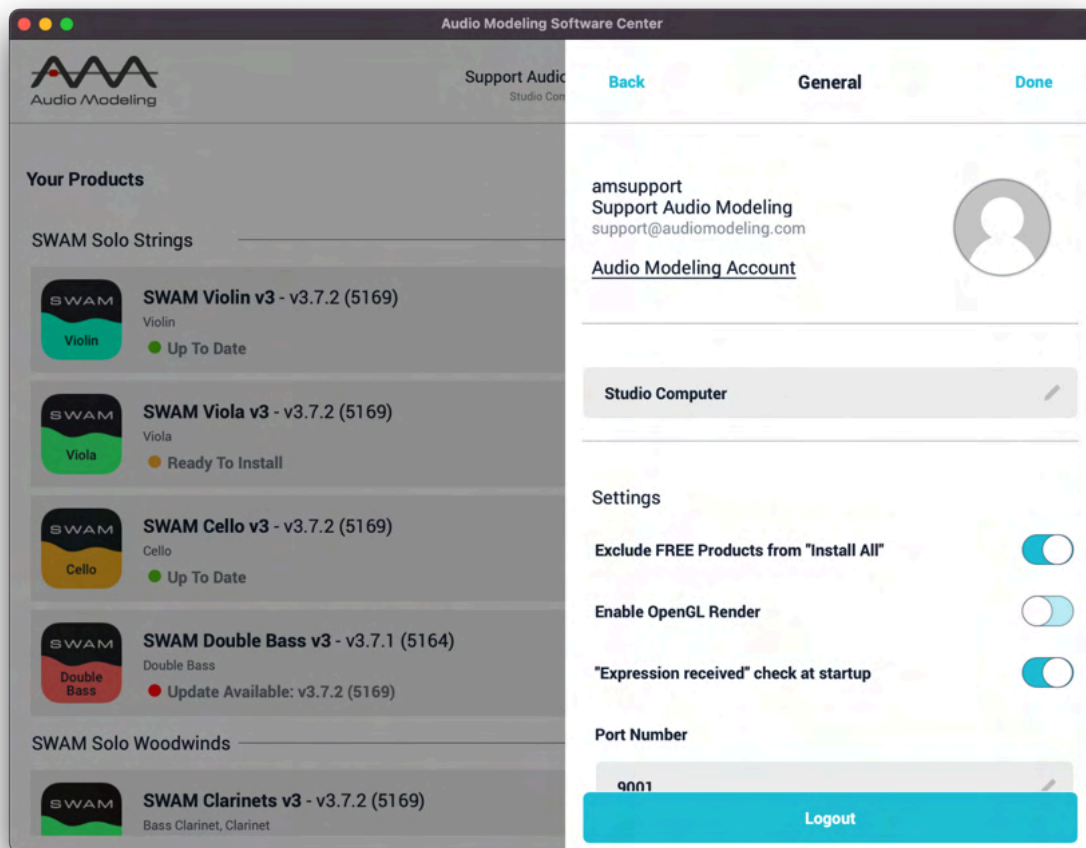
Options



- Disable screensaver: avoid screensaver activation when the App is open
- Enable virtual MIDI ports (macOS 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 slider values
- Middle C4: set octave notation so that Middle C is C4, corresponding to MIDI note number 60. If deselected, Middle C is C3.

Global Settings

Common / global settings for all products are managed from the Audio Modeling Software Center application. Click on the “...” menu and select “General” option.



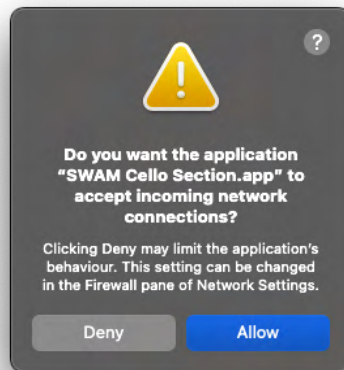
These settings apply to all installed SWAM products

- Enable OpenGL Render: when selected, render the graphics of SWAM instruments.
- "Expression received" check at startup: when selected, warns the user to check the controller mapped to the Expression parameter if a note is received before an Expression event (for Desktop version only)
- Port Number: (OSC Settings) used for the intercommunication of SWAM String Sections instances via Open Sound Control (OSC) UDP network messages on port 9001. You can change the port number and select a port from 5000 to 9999.
- Multicast IP Address: (OSC Settings) used for the intercommunication of SWAM String Sections instances via Open Sound Control (OSC) exclusively on 234.0.0.0 IP address.

NOTE: providing local network permission to your DAW or standalone SWAM String Sections instances is mandatory to allow proper communication between SWAM instruments.

If you Firewall protection is enabled, you should see the following alert message:

macOS:



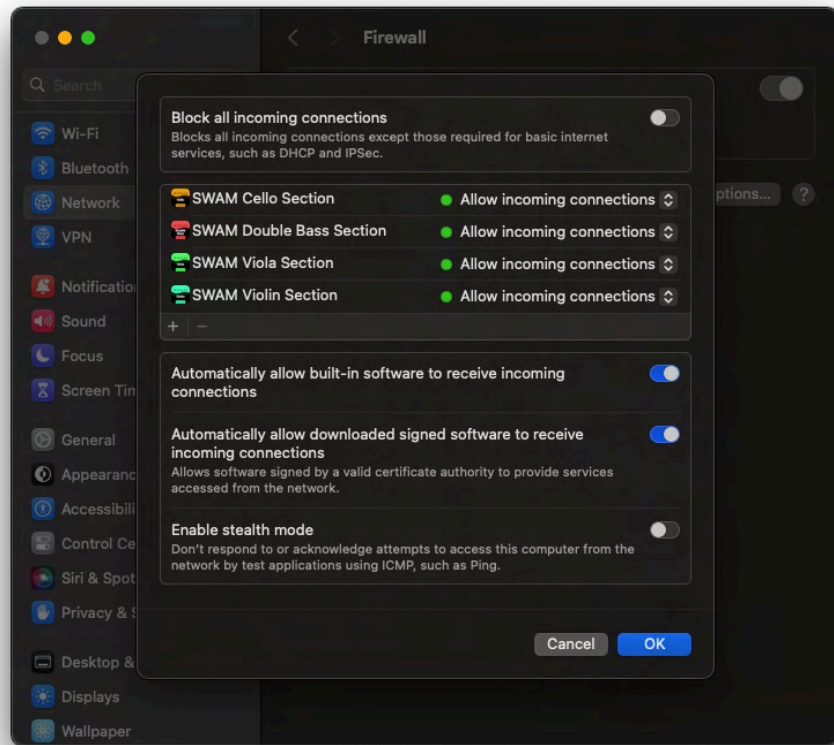
Windows:



If you have denied network permission, you can re-enable it in the operating system control panel.

macOS

System Settings ... -> Network -> Firewall -> Options ...
and select "Allow incoming connections" for each SWAM instruments



Windows

Settings -> Privacy & security -> Windows Security -> Firewall & network protection -> Allow an app through firewall
and select "Allow another app..." for add SWAM instruments

Allow apps to communicate through Windows Defender Firewall

To add, change, or remove allowed apps and ports, click Change settings.

[What are the risks of allowing an app to communicate?](#)

[Change settings](#)

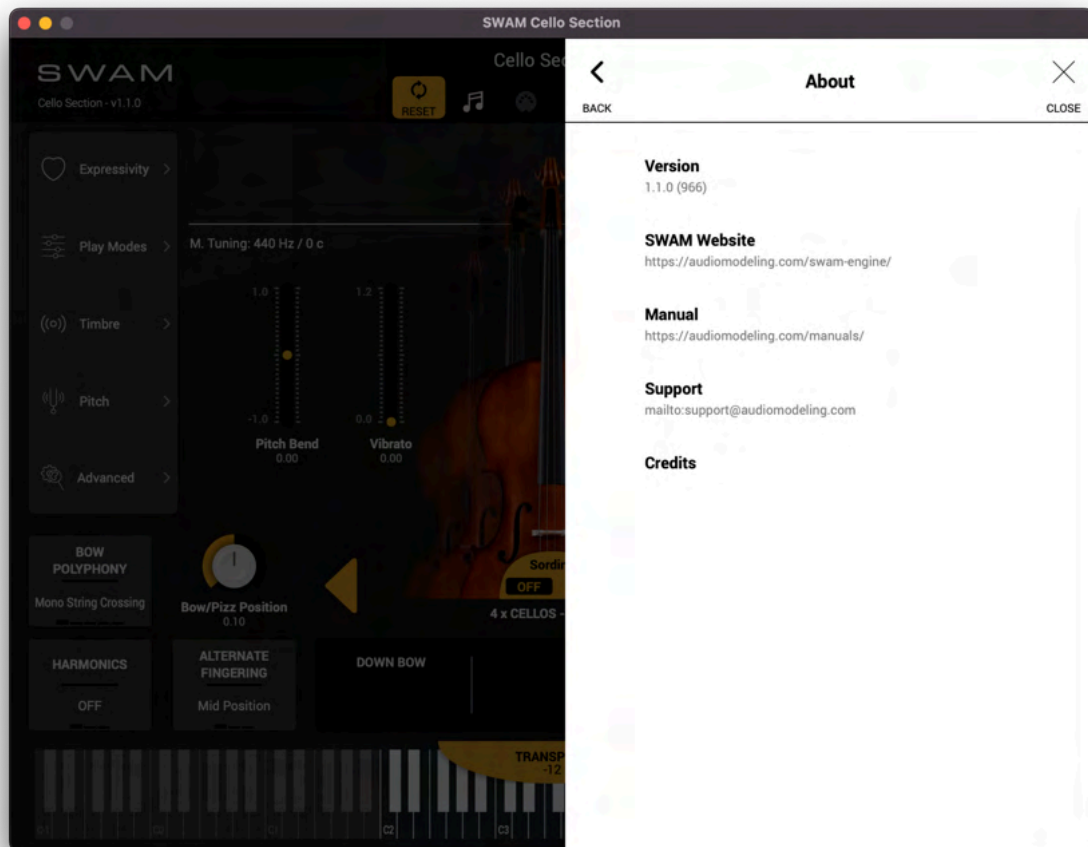
Allowed apps and features:

Name	Private	Public
<input checked="" type="checkbox"/> Spotify Music	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> Start	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> Store Experience Host	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> SWAM Cello Section	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> SWAM Double Bass Section	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> SWAM Viola Section	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> SWAM Violin Section	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> Take a Test	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/> TPM Virtual Smart Card Management	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> Virtual Machine Monitoring	<input type="checkbox"/>	<input type="checkbox"/>
<input checked="" type="checkbox"/> VST 2.x Plug-In Scanner	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/> VST 3.x Plug-In Scanner	<input type="checkbox"/>	<input checked="" type="checkbox"/>

[Details...](#) [Remove](#)

[Allow another app...](#)

About



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

- Version: the current version and build number of the App. On Desktop, click on "Version" to open the Customer Portal and check for updates.
- 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.

Key Switches

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".

Key switches are colored red on the instrument's virtual keyboard.

Important note about Key Switches: "latch" Key Switches are sensitive to the KS velocity, even for two-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 from 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 = Bow
 - Mid Velocity = Pizzicato
 - High Velocity = Pizzicato
- 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 Bow
 - Up Bow
- F# = Harmonics
 - Off (default)
 - 2nd harmonic

- *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)

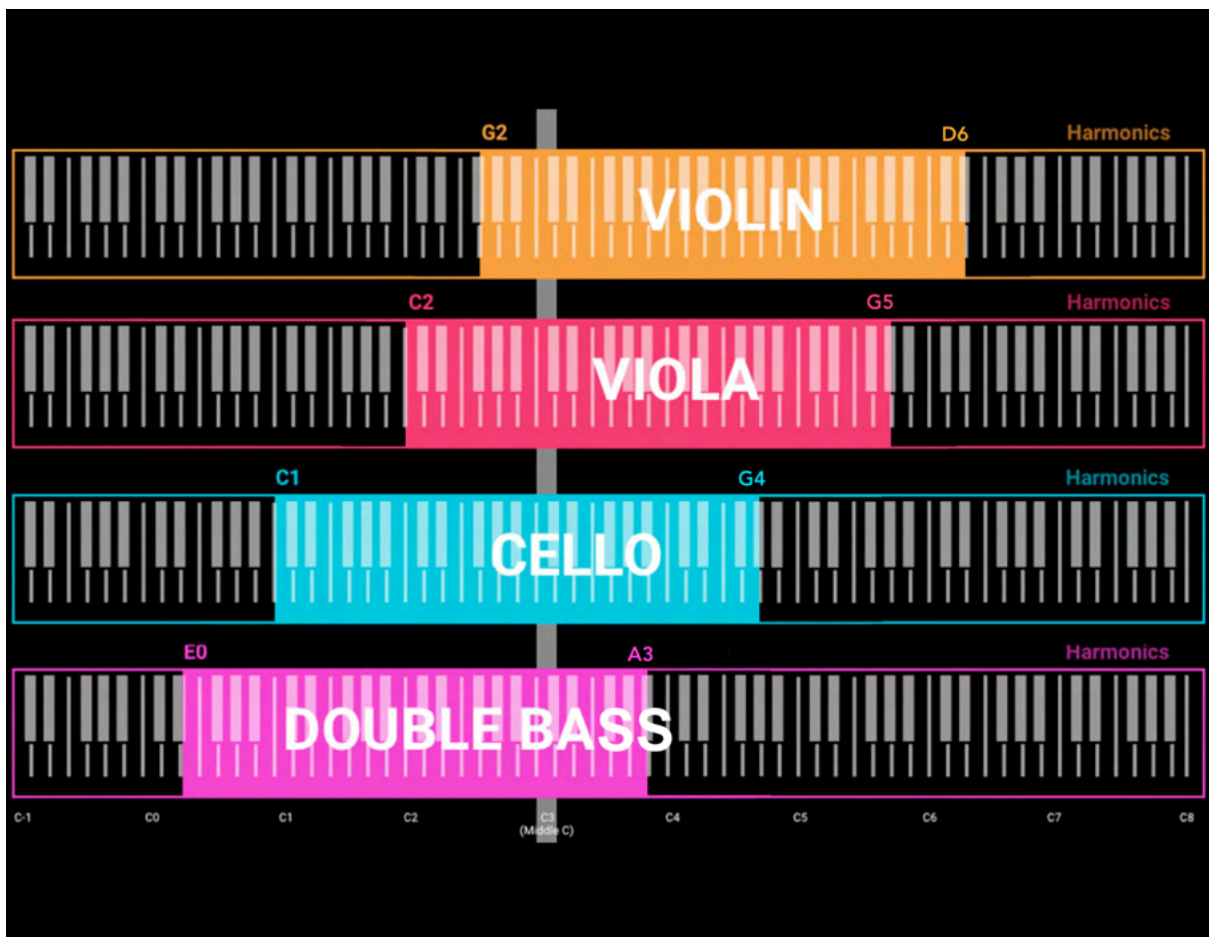
- B+C: Bow Mono String Crossing
- B+C#: Bow Mono Poly Release
- B+D: Bow Double
- B+D#: Bow Double/Hold
- B+E: Bow Auto
- B+F: Pizzicato Mono String Crossing
- B+F#: Preferred strings 4-3 (for Double/Hold only)
- B+G: Pizzicato Polyphony
- B+G#: Preferred strings 3-2 (for Double/Hold only)
- B+A#: Preferred strings 2-1 (for Double/Hold only)

Instruments ranges

- SWAM Violin Section: from G2 to D6
- SWAM Viola Section: from C2 to G5
- SWAM Cello Section: from C1 to G4
- SWAM Double Bass Section: from E0 to A3

Notes:

- Values provided refer to Middle C = C3
- SWAM Cello Section and SWAM Double Bass Section are transposed -12 semitones by default. Set transposition to 0 to play with real pitch.



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.

Scratchy Attacks

To obtain a scratchy attack 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.

Open String Pizzicato Strum

The procedure to play an open-string strum is:

"Play Mode" - set to "Pizzicato"

"Alternate Fingering" - set to "Near the Nut + Open".

Press Sustain pedal and play the desired open strings, staccato.

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.