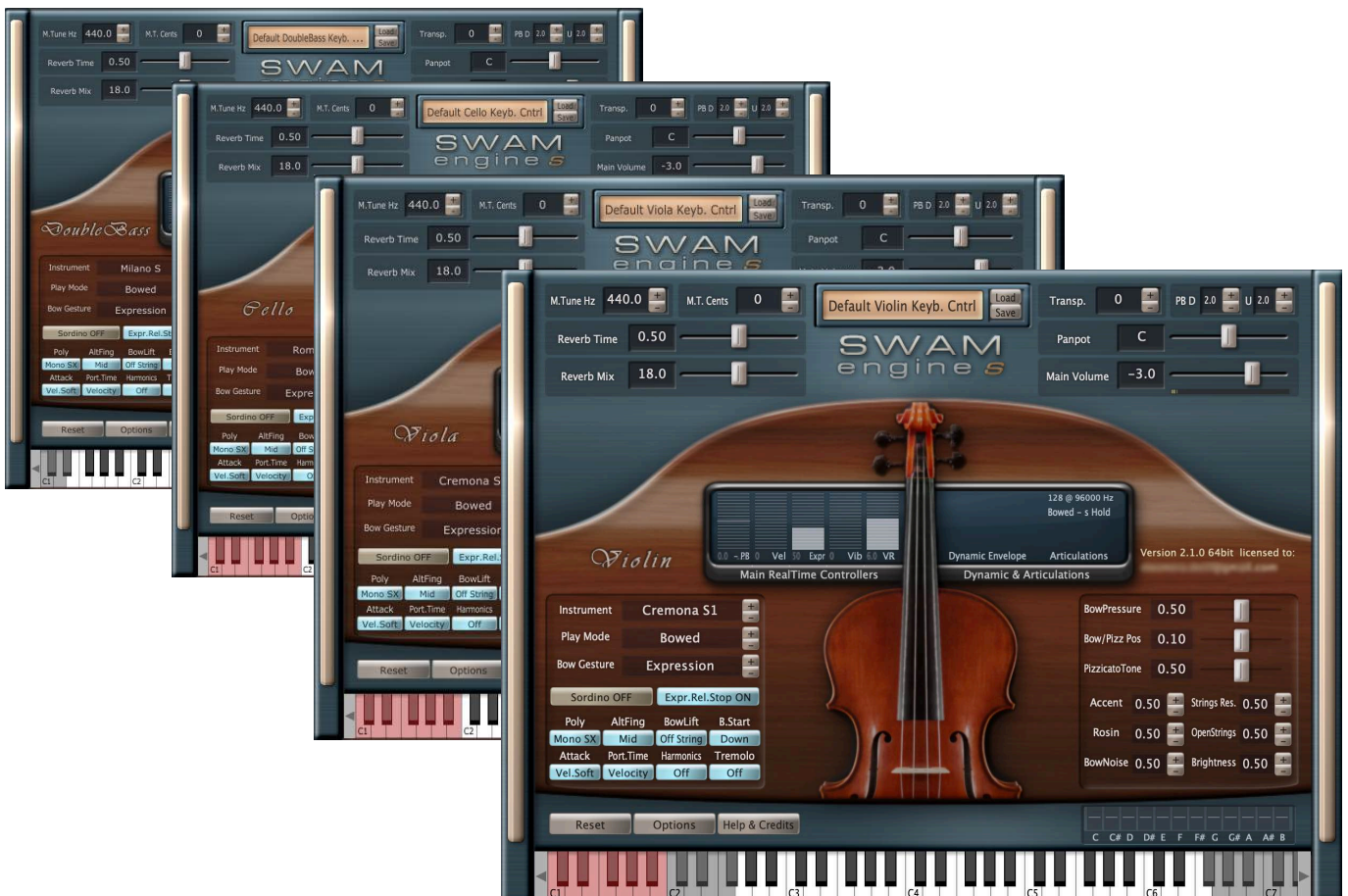


# SWAM Solo Strings - User Manual

Violin, Viola, Cello, Double Bass v2.1.0

# SWAM engine

by



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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 a much shorter time. Also listen to the demos on the Audio Modeling website <https://audiomodeling.com>

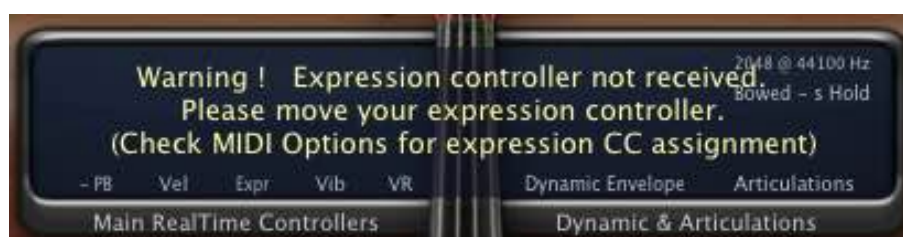
The latest version of all SWAM manuals can be found at <https://audiomodeling.com/manuals>

All SWAM instruments are designed to be PLAYED in real time by shaping the sound like a real instrumentalist would. They will function on any modern computer (see System requirements), by using a suitable host such as a sequencer (Cubase, Logic, Pro Tools, etc.), DAW (digital audio workstation) or a host application supporting the plugin format VST, Audio Units or AAX. These instruments use Audio Modeling's proprietary SWAM (Synchronous Wave Acoustic Modeling) technology conceived by Stefano Lucato, and provide an exceptional playability and realism. These are not samples, using pre-recorded articulations, but 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. (It is, however, essential that the instruments are suitably controlled using an appropriate MIDI device, as described in this manual). Direct programming via a sequencer (without any MIDI devices) is also possible.



**Note:** As with a real musical instrument, all of our SWAM instruments allow continuous transition across the full range of dynamics — from pp to ff — free from any phasing artifacts. To accomplish this, it is absolutely necessary to use a suitable continuous physical MIDI controller such as an expression or volume pedal (CC11 or CC7), a breath or wind controller (CC2) or any other expressive MIDI controller.

**WITHOUT SUCH A CONTROLLER, THE INSTRUMENT WILL NOT WORK**, if 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 mod wheel, though not recommended, can be used for this purpose. Please refer to other sections of this manual for further details.

When used for studio production, it is necessary to provide either a MIDI Expression curve or Automations.



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

# System requirements

## Required operating systems

PC:

Windows 7, 8, 10, Vista or XP 64 bit

macOS:

Intel only, Mac OS X 10.7 – 10.14

## Supported plugin formats

PC:

VST\* 64 bit, AAX 64 bit

macOS:

AU\* 64 bit, VST\* 64 bit, AAX 64 bit

\* Audio Unit v3 and VST3 not supported yet

## CPU load

The realism and expressiveness of the SWAM instrument set can be very CPU intensive. It therefore requires a modern computer with at least a 1.6 GHz Core 2 Duo CPU for a single instance of any SWAM product. 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, involving higher latencies.



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

# Hardware requirements

## Audio interface (sound card)

A good quality audio interface (USB, FireWire, PCI) with suitable low-latency drivers (like ASIO for PC users) is required. The allowed buffer size is up to 2048 samples. Recommended settings are 128, 256 samples, or 512 samples (higher latency, but less CPU load).

## MIDI devices

SWAM instruments (like any other virtual instrument) can be successfully used without the need for any additional hardware (except the audio interface) 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 overblow, subharmonics, growl, etc.

An expression pedal, controlling the dynamics via CC11. 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 or Hornberg Research HB1, can be used. Using a pedal or a breath controller is highly recommended.

Woodwind or brass players may prefer to use a wind controller such as a Yamaha WX, Akai EWI (USB, 4000S or 5000) or Aodyo Sylphyo; all of them provide excellent results.

Multi-expressive devices like the Seaboard or the LinnStrument are supported.

# Software requirements

A DAW (Digital Audio Workstation) or a Host capable of running VST2.4, Audio Units or AAX plugins is needed to run SWAM instruments.

If you do not have a host application capable of running VST or AU plugins, you can install a free host application such as Camelot (<https://camelotpro.com>).

A list of compatible hosts and DAWs can be found on our Knowledge base:  
<https://support.audiomodeling.com/kb/faq.php?id=39>

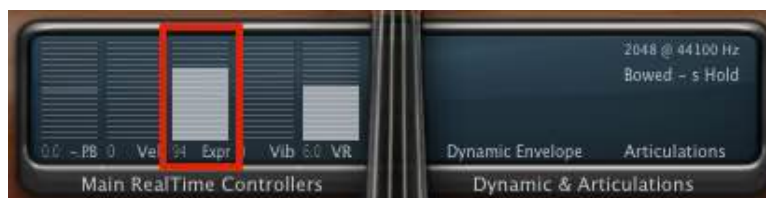
# Using an appropriate range of expression

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

All real 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, inevitably leading 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 overusing dynamics.

It is 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.

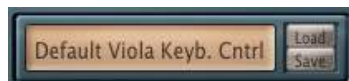


# Main View

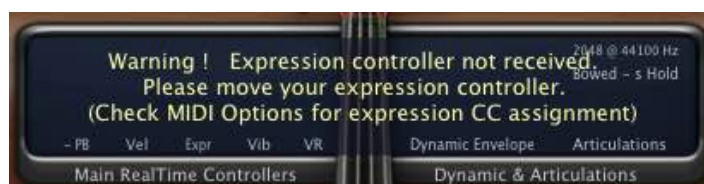
If properly activated (please read the enclosed "Installation guide"), the instrument GUI should appear as follows after loading:



Please select the proper default instrument preset (keyboard or wind controller) by clicking the Load button to the right of the upper central display window, using your currently available MIDI input device (see above), for example:



When you begin playing, you may receive a warning message reminding you that an expression controller (preferably CC11, CC7, CC2 or AfterTouch for tactile devices like the Seaboard or the LinnStrument) is absolutely necessary for the proper functioning of the instrument:



By default, the software assigns the expression control to CC11 if in keyboard mode, and to CC2 if in wind controller mode. These default settings can be manually changed. For example, if you wish to use a volume pedal to control the expression, just open the "MIDI mapping" page (clicking on the "Options" button and then on "MIDI mapping" button) and set the Expression CC to 7. If needed, this assignment can be permanently stored as a preset (see below). Automatic assignment is also possible. Just open the "MIDI mapping" page and activate the "Learn" button next to the "Expression" MIDI CC mapping entry. In this mode, the instrument recognizes the first incoming CC number and automatically assigns it to the Expression setting.

The loaded preset will be displayed as "Default <instrument> Keyb.Cntrl". These settings are suitable for playing the instrument with a MIDI (or USB) keyboard, expression pedal, pitch bend and mod wheel.

When using a breath controller, please select the preset "Default <instrument> Breath Cntrl", or click on "Reset" -> "Default Breath Controller". If you are using a wind controller (e.g. EWI, WX or Sylphyo), please load the preset: "Default <instrument> Wind.Cntrl", or click on "Reset" -> "Default Wind Controller". The Expression setting is automatically remapped to CC2. Please note that in WC mode the legato/portamento time is per default controlled by CC5 (it is possible to assign a different CC number in the "MIDI mapping" page).

## Main controls vs. articulations

Velocity controls:

- Initial attack (for detached notes)
- Portamento time (for legato, if Transit.Time button is set to Velocity)

Expression (CC11, CC2, CC7 or other CCs set on the "MIDI Mapping" page) controls the dynamics (from pp to ff)

Mod wheel (CC1) controls the vibrato intensity

CC19 controls the vibrato rate

Pitch bend controls the pitch. The pitch bend range (downwards — upwards, in semitones) can be directly set by the user in the main GUI (see page 10)

Staccato, legato, portamento and bow-change articulations are managed by a special algorithm which takes into account:

- Note velocity
- Interval between the notes (semitones)
- Time between Note-Off and subsequent Note-On

All the assigned MIDI CC numbers can be modified in the "MIDI mapping" page.

# GUI parameter controls

There are four types of GUI controls:

- Sliders
- Inc/Dec Buttons (+/-)
- Multi-state buttons
- Drop-down select boxes

## Sliders

Set the desired value either by:

- Dragging the slider (while holding the left mouse button) or
- Moving the slider with the mouse wheel

## Inc/Dec Buttons (+/-)

The values can be set in 3 different ways:

- Clicking on "+" and "-"
- Using the mouse wheel to change values via the label (small steps), or on the +/- button (larger steps)
- Vertically dragging the mouse after clicking on the displayed value

## Multi-state Buttons

Every click on a Multi-state button will set a new value; when the last value is reached, an additional click will restart the sequence from the first value.

## Drop-down select boxes

Just click either on the box or on the little arrows and select the desired value from the list. When the list is displayed, it is also possible to select different values using the arrow keys or acting on the mouse wheel.

To restore the default value for a parameter, double-click on the Slider or on the label of the Inc/Dec button. It is not possible to restore a default value for a Multi-state button or for a Drop-down select box.

## General controls



Load & Save <sup>1</sup> :	Loads and saves instrument settings
M.Tune Hz:	Master Tune frequency in Hz
M.T.Cents:	Master Tune in cents (Linked to M.Tune Hz, A3 = 440Hz)
Reverb Time:	Reverb duration
Reverb Mix:	Reverb amount (if set to "Off", the reverb is bypassed, saving CPU)
Transp:	Instrument transposition (Key switches are not transposed); current instrument range indicated on the virtual keyboard (black & white keys) follows the transposition
PB D .. U .. :	Pitch bend range; can be set to bend down and up independently (in semitones)
Panpot:	Panning between L and R (see also Pan Type on the Options page)
Main Volume:	Instrument output level (in dB)

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### <sup>1</sup> Default Load & Save paths are:

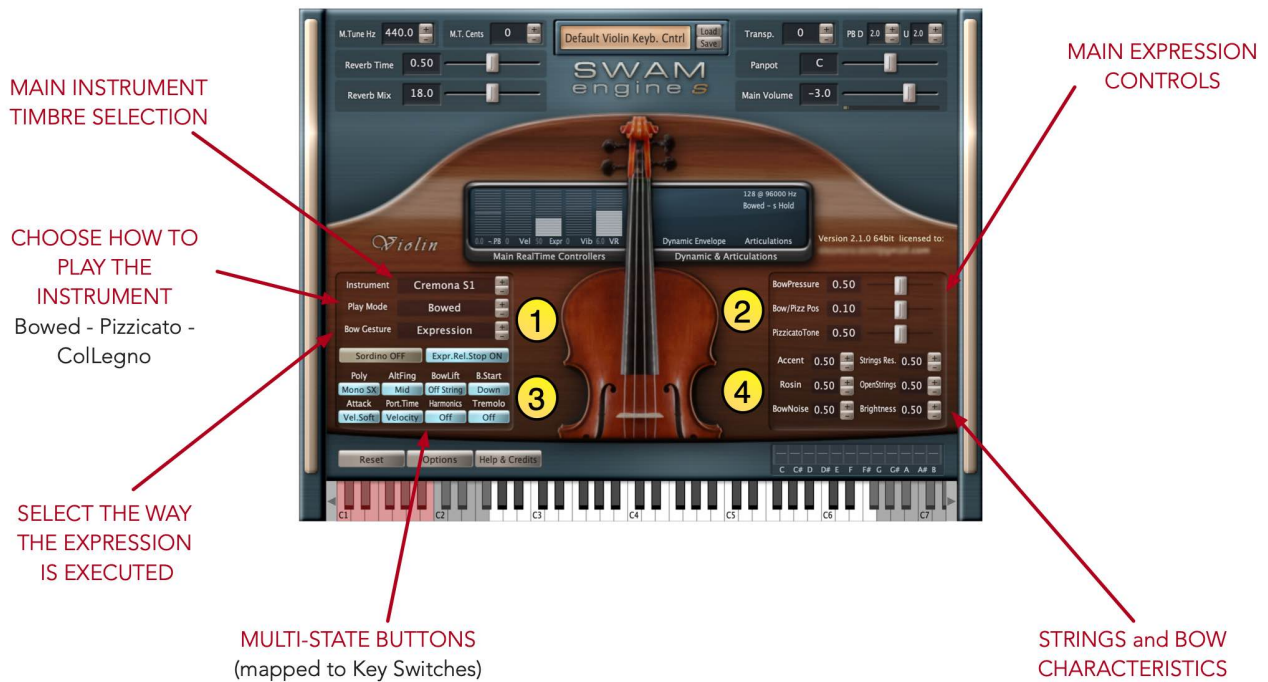
Windows, VST or AAX plugins:

<Program Files>/Audio Modeling/SWAM/<Package Name>/<Instrument Name>/Presets

Mac, AU, VST or AAX plugins:

<HD>/Users/Shared/Audio Modeling/<Package Name>/<Instrument Name>/Presets

Otherwise the folder selected for the latest saved preset is shown.



## 1) Timbre and Gesture

Instruments: main instrument timbre of the resonating body

Play Mode: choose how to play the instrument:

[mapped to Key Switch C]

- Bow
- Pizzicato
- Col Legno

Bow Gesture: 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 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 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. *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. *Note: this gesture is not suitable for Breath and Wind Controllers. It is intended for pedals, wheels, ribbons, X-Y pads and similar.*

Sordino ON / OFF: activates/deactivates "Con Sordino".  
[mapped to Key Switch A# - see the Key Switches chart for details]

Expr.Rel.Stop ON / OFF: when ON the release can be stopped setting the Expression to zero. For Wind Controllers, Breath Controllers and expressive controllers with expression release concurrent to the note-off: set this parameter to "OFF", to avoid a sudden termination of the vibrating string release.

## 2) Further Expression Controls

In addition to the usual main controls of Velocity, Expression, Pitch-Bend and Vibrato, string instruments also have the following:

BowPressure: pressure ratio of the bow on the string in relation to the bow speed. Lowest values produce a "Flautato" sound. Highest values produce a scratchy sound.

Bow/Pizz Pos: distance of the bow/finger from the bridge. This parameter influences the character of the sound, as in the real instrument.

PizzicatoTone: color of the pizzicato pluck.

## 3) Multi-state buttons

Poly: selects the polyphony.

[mapped to Key Switches B+C, B+C#, B+D, B+D#, B+E]

As in the real instrument, also two simultaneous notes can be performed, but they always lay on two adjacent strings.

- Mono SX [B+C]: the instrument is monophonic; legato/portamento is achieved overlapping two notes. If the legato/portamento involves two adjacent strings, the release of the first note is stopped in order to avoid a "bichord" during the transition, depending on the interval set with the "Mono String Crossing" option (see Options page).
- Mono [B+C#]: the instrument is monophonic; legato/portamento is achieved 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 "Dbl/Hold Str. Selection" in Options page (assignable to MIDI CC) or by the Key Switches B+F# (strings 4-3), B+G# (strings 3-2), B+A# (strings 2-1).
- 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 Detect. Time" parameter in Options page.

AltFing: 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).*

[mapped to Key Switch D#]

- 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 (C G D A). Vibrato is not possible on open strings.

BowLift: 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.*

[mapped to Key Switch E]

- Off String: the bow does not touch the string.
- On String: the bow touches the string.

B.Start: selects the bow direction for the staccato stroke (after a short interval time from the latest note-off):

[mapped to Key Switch F]

- Down: staccato are performed in down-bow.
- Up: staccato are performed in up-bow.

Attack: attack behavior:

- Vel. Soft: velocity controls attack strength; soft attack.
- Vel. Hard: velocity controls attack strength; hard attack.
- Expression: expression controls attack shape.
- Mix: the attack strength is controlled by both the velocity and the initial expression.

See also "Env Attack Speed" in Options page for controlling the character of the attack.

Port.Time: portamento time behavior:

- Velocity: velocity controls the portamento time for overlapped notes.
- CC: MIDI CC controls the portamento time for overlapped notes (see "MIDI mapping" for CC mapping). It is possible to remap the range of the Portamento Speed acting on the Min/Max values of the related MIDI CC; if the Min value is greater than the Max value, an inverted mapping is performed:
  - Min < Max: Low CC value -> Slow portamento
  - Min > Max: Low CC value -> Fast portamento

Harmonics: overtones generation:

[mapped to Key Switch F#]

- Off: no overtone.
- OTone 1: first overtone (one octave higher).
- OTone 2: second overtone (one octave and a fifth higher).

Tremolo:

[mapped to Key Switch G#]

- Off: no tremolo.
- Slow: slow tremolo.
- Fast: fast tremolo.

Tremolo speed and behavior are controlled by the "Trem. Min Speed" and "Tremolo Mode" parameters in Options page. A "manual" tremolo is possible using the Key Switch C# (bow-change at both note-on and note-off).

## 4) Strings and bow characteristics

Accent: accent amount as a function of the velocity.

Rosin: amount of rosin, affects the stickiness between the bow and the string.

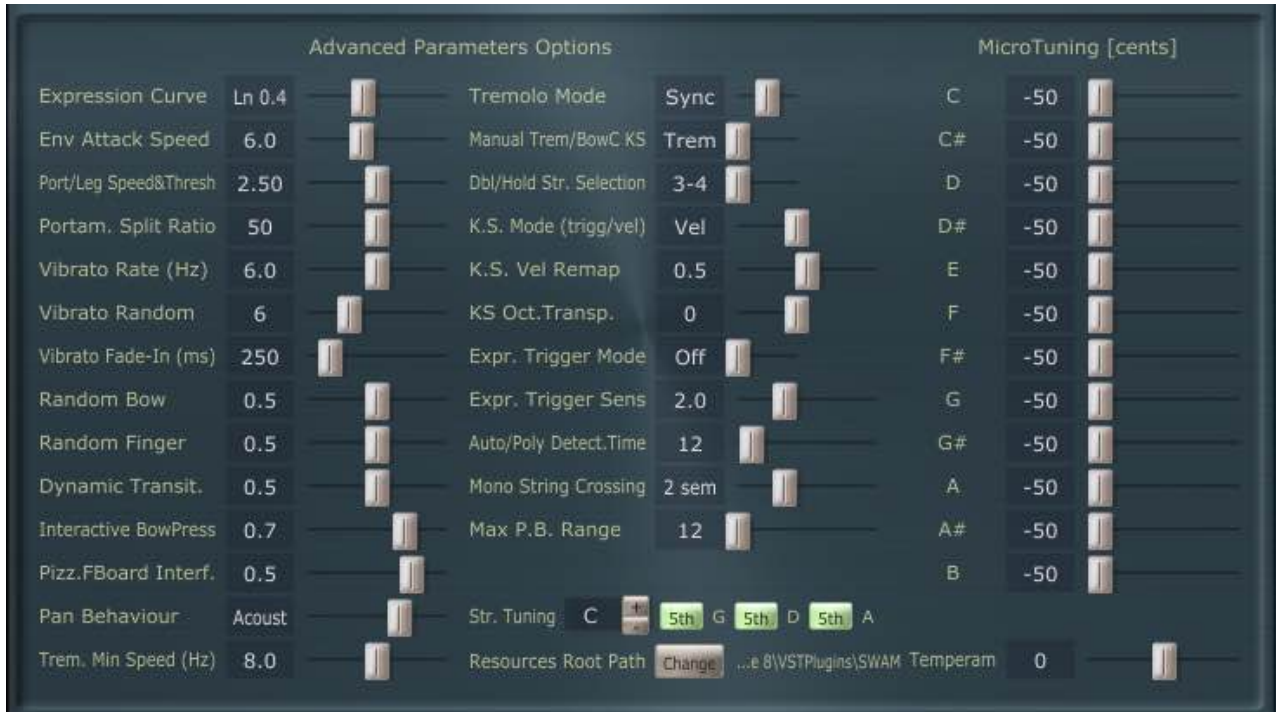
String Res.: resonance of the string.

BowNoise: amount of noise produced by the bow rubbing the string.

FreeStrings: amount of sympathetic effect (resonance) produced by free strings.

Brightness: mid-high EQ of the string sound.

# Options Page



Expression Curve: remapping of the input expression CC values.

Env Attack Speed: steepness of the attacks.

Port/Leg Speed&Thresh: controls both the portamento speed and the threshold between portamento (low velocity/CC) and legato (high velocity/CC). When set to the maximum value ("no Port"), portamento is excluded.

Portamento Split Ratio: 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.

*[see MIDI mapping for a real-time control of this parameter through MIDI]*

Vibrato Rate (Hz): speed of the vibrato in Hz.

*[see MIDI mapping for a real-time control of this parameter through MIDI]*

Vibrato Random: amount of randomness of the vibrato.

Vibrato Fade-In (ms): fade-in time for the Vibrato at each note-on.

Random Bow: amount of randomness of the bow pressure, speed and position.

Random Finger: amount of randomness of the left-hand finger position (pitch).

Dynamic Transit.: controls the shape of the expression during legato transitions.

Interactive BowPress: controls the amount of correction of the bow pressure to maintain a good vibrating sound.

Pizz.FBoard Interf.: controls the amount of interference between the string and the fingerboard during pizzicato.

Pan Behavior: selects the pan behavior of the instrument vs. reverb ("Dyn1" and "Dyn2": mimics little movements of the player with different intensities, pan does not affect the reverb. "Acoustic": the player is static, pan does not affect the reverb. "Balance": the player is static, pan affects both the instrument and the reverb).

Trem. Min Speed (Hz): 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. 8 means quavers, 8T means quaver triplets, 16 means semiquavers, 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 8T, "Fast" is 16).

*[see MIDI mapping for a real-time control of this parameter through MIDI]*

Tremolo Mode: selects the tremolo rate behaviour:

- Hz: the tremolo rate is not synchronized with the current project BPM.
- Sync: the tremolo rate is synchronized with the current project BPM. 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; an accent is performed every four or three strokes, depending on the selected note length (plain vs triplets).

*[mapped to Key Switch A]*

*[see MIDI mapping for a real-time control of this parameter through MIDI]*

Manual Trem/BowC KS: sets the behavior for the C# Key Switch:

- Trem: 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.Ch: 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.

Double/Hold Str. Selection: sets the preferred pair of strings for bichords.

*[mapped to Key Switch B combined with F#, G# and A# - see the Key Switches chart for details]*

K.S. Mode (trigg/vel): sets how the Key Switches behave:

- Trigg: a KeySwitch status is selected by quickly triggering the Key Switch for a number of times corresponding to the position of the status to select. (e.g. Key Switch C – PlayMode: press the C key one time for "Bow", press the C key two times for "Pizzicato", press the C key three times for "Col Legno").
- Vel: a Key Switch status is selected in function of the note-on velocity of the Key Switch.

*[see the Key Switches chart for details]*

K.S. Vel Remap: velocity response remapping for the Key Switches, when the K.S. Mode is set to "Vel".

*[see the Key Switches chart for details]*

KS Oct Transp: KeySwitch Octave Transposition; "0": no transposition; "-12": moves the keyswitch section 1 octave lower; "Off": disables the Key Switches.

*[see the Key Switches chart for details]*

Expr. Trigger Mode: when set to "On": triggers note-on & note-off when the expression controller goes above or below a certain threshold. This is a very important feature when playing a breath controller: as with a real instrument, the depressed key only determines the (initial) note played, but does not trigger it. The note is only actually played when the player blows into the BC device, and stops when the airflow ceases.

*Note: choosing the breath controller preset on the instrument preset menu automatically activates this mode and sets the expression to CC2.*

Expr. Trigger Sens: controls the responsiveness of the attack steepness when "Expr. Trigger Mode" is active (see above).

Auto/Poly Detect. 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.*

Mono String Crossing: affects the transitions across adjacent strings when the “Poly” parameter is set to “Mono SX” (see page 11). 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 semitone (minor 2nd) for the first option (1 sem)
- 1 or 2 semitones (minor 2nd and major 2nd) for the second option (2 sem)
- 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 (Harm)
- always for the fourth option (All)

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

Max P.B. Range: set the maximum range for Pitch-Bend Up/Down. Useful for MPE devices.

Str. Tuning: tuning of the lowest string (+/- 4 semitones for Double Bass, Viola, Violin, +/- 7 semitones for Cello) 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.

Resources Root Path: shows the root path for the Resources folder of the plugin. By default, this is the folder set (or chosen – Windows only) during the installation.

Windows only / Experts only: it is possible to change the Resources Root Path pressing the “Change” button and choosing the path to the folder containing the Resources for the plugin.

The folder structure for the Viola and Cello Resources is:

<Resources Root Path>\Strings\Viola\Resources  
<Resources Root Path>\Strings\Cello\Resources

*Important! Setting a new Resources Root Folder from the plugin does not move the current Resources folder into the new location. The Resources folder should be moved manually.*

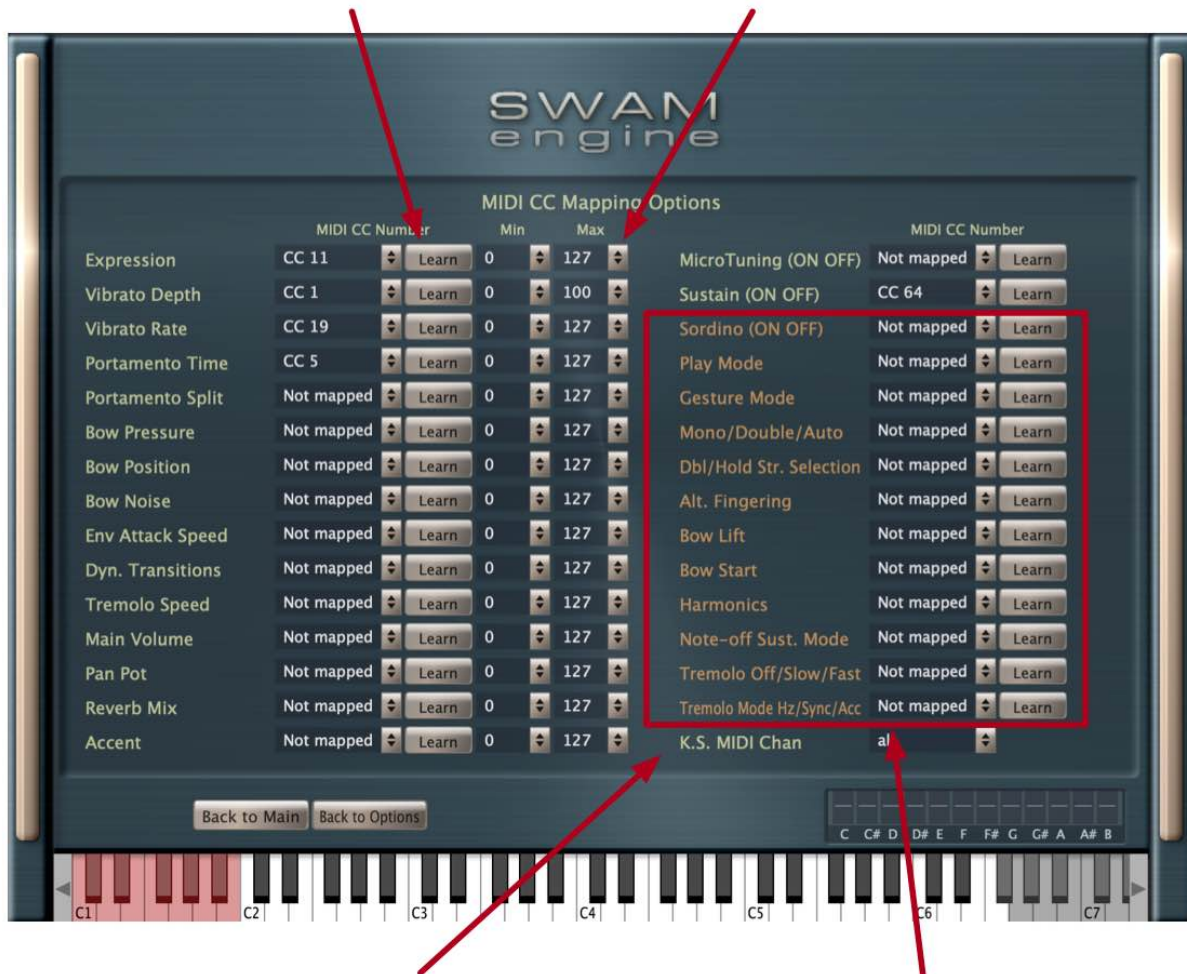
# MIDI mapping Page

## Learn button for each parameter

Click to activate the Learning function.  
Move a MIDI control to set the CC number.

## Min/Max for MIDI input value rescaling

All incoming MIDI values can be rescaled according to the related Min/Max value



## Specific MIDI Channel for the Key Switches

It is possible to control the KeySwitches on a different MIDI channel

## Controls mapped to Key Switches

It is also possible to map these controls to specific CC numbers

All the main parameters of the instrument are assignable to respond to MIDI CCs so they can be controlled in real-time from a MIDI controller or from a MIDI sequence in a DAW.

It is possible to assign the same MIDI CC to more than one parameter; in addition, it is possible to act on the Min/Max controls to rescale the input MIDI values.

Note: when the value assigned to "Min" is greater than the value assigned to "Max", the polarity of the control is inverted, i.e. the parameter is reduced when the control is increased.

Note: MicroTuning, Sustain and Sordino have only On (CC>=64) and Off status (CC<64).

## Examples

Example 1. Add an extra-variation of the bow pressure in function of the Expression:

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

Example 2. Play nearer the Ponticello in function of the Expression and Bow Pressure:

- Expression: CC 11 – Min = 0, Max = 127
- Bow Pressure: CC 11 – Min = 55, Max = 80
- Bow Position: CC 11 – Min = 80, Max = 40

Example 3. Slightly variation of the Vibrato Rate in function of the Expression:

- Expression: CC 11 – Min = 0, Max = 127
- Vibrato Rate: CC 11 – Min = 55, Max = 70

Example 4. Limitation of the maximum Vibrato intensity:

- Vibrato Depth: CC 1 – Min = 0, Max = 90

# 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 Oct. Transp." parameter (see Options page). Key switches can be disabled by turning "KS Oct. Transp." To "Off".

The key switches are colored red on the virtual keyboard of the instrument.



**Important note about Key Switches: "latch" Key Switches (see the K.S. chart) 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.**

C: Play Mode (Bowed / Pizzicato / Col Legno)

C#: Manual Tremolo / Bow Change (see Manual Trem/BowC KS in Options page)

D: Gesture Mode (Current Gesture / Bowing)

D#: Alternative Fingering (Mid / Bridge / Nut+Open)

E: Bow Lift (OFF string / ON string)

F: Bow Start (Down / Up)

F#: Harmonics (Off / OverTone1 / OverTone2)

G: Note-off Sustain [for Bow Change] (Hold / Acc / Fade)

G#: Auto Tremolo (Off / Slow / Fast)

A: Auto Tremolo Mode (Hz / Sync / Sync Acc.)

A#: Sordino (Off / On)

B: 2<sup>nd</sup> page

2<sup>nd</sup> page of Key Switches (hold B Key Switch)

B+C: Real Mono

B+C#: Mono

B+D: Double

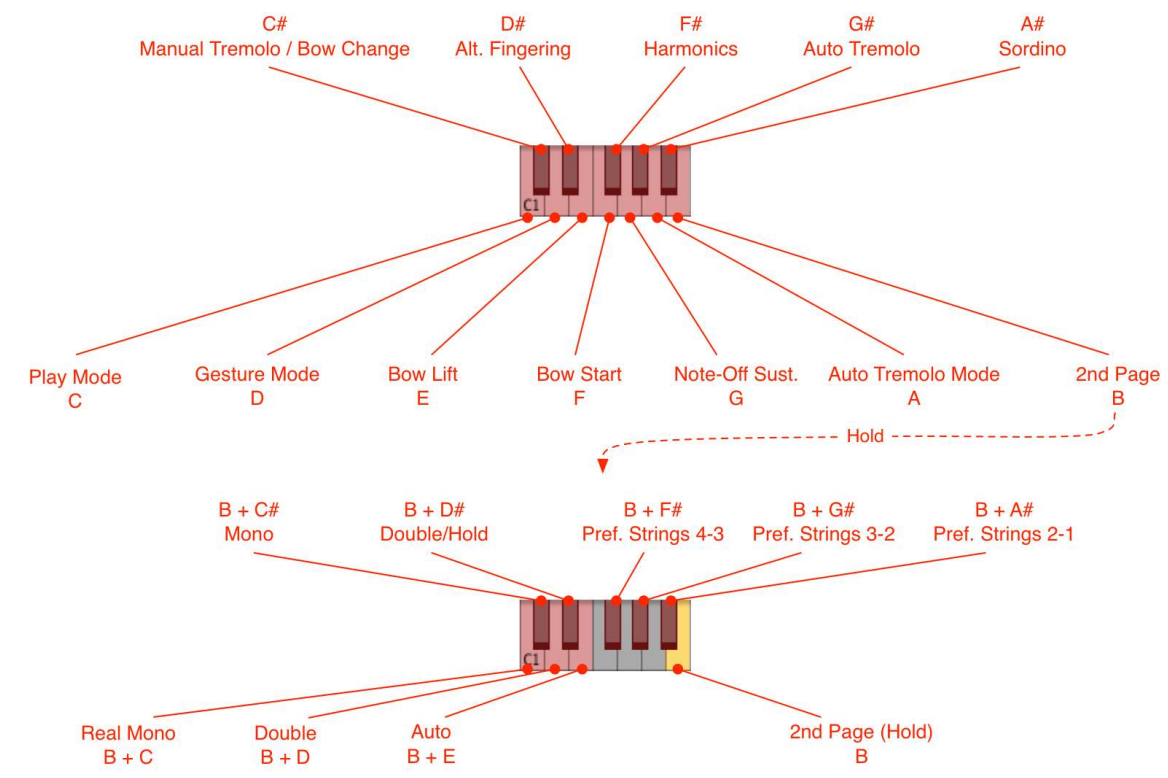
B+D#: Double/Hold

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)



## Key Switches chart (from C to F)

Note	C	C#	D	D#	E	F
Parameter Name	PlayMode	Manual Tremolo / Bow Change	Gesture Mode	Alt. Fingering	Bow Lift	Bow Start
Action event	Next STACCATO Note-on	Immediately	Next STACCATO Note-on	Next Note-on	Immediately	Next STACCATO Note-on
Latch/Temporary	Latch	Temporary, both Note-on and Note-off	Latch	Latch	Temporary	Latch
Velocity (KS Vel Remap = 0.0)	Bowed: <= 42, Pizzicato: <= 84, Col Legno: >= 85	NO	Curr. Gest: <= 84, Bowing: >= 95	Mid: <= 42, Bridge: <= 84, Nut+Open: >= 85	Off Str.: note-off, On Str.: note-on	Down: <= 63, Up: >= 64
Velocity (KS Vel Remap = 1.0)	Bowed: <= 73, Pizzicato: <= 103, Col Legno: >= 104	NO	Curr. Gest: <= 103, Bowing: >= 104	Mid: <= 73, Bridge: <= 103, Nut+Open: >= 104	Off Str.: note-off, On Str.: note-on	Down: <= 84, Up: >= 85
MIDI CC	Bowed: <= 42, Pizzicato: <= 84, Col Legno: >= 85	NO	Expr: <= 42, Bipolar: <= 84, Bowing: >= 85	Mid: <= 42, Bridge: <= 84, Nut+Open: >= 85	Off String: <=63, On String: >= 64	Down: <= 63, Up: >= 64
Trigger count	1 = Bowed, 2 = Pizzicato, 3 = Col Legno	NO	1 = Expr, 2 = Bipolar, 3 = Bowing	1 = Mid, 2 = Bridge, 3 = Nut+Open	1 = Off String, 2 = On String	1 = Down, 2 = Up
Annotations		Manual Trem/BowC KS Option: - <b>Trem</b> : Bow-change at each note-on / note-off - <b>Bow.Ch</b> : Bow-change at each note-on only				

### 2nd Page Key Switches (poly management)

While 2nd page KS Selector is pressed (B)

Note	B + C	B + C#	B + D	B + D#	B + E	B + F
Parameter Name	Real Mono	Mono	Double	Double/Hold	Auto	
Action event	Next Note-on	Next Note-on	Next Note-on	Next Note-on	Next Note-on	
Latch/Temporary	Latch	Latch	Latch	Latch	Latch	
Velocity (KS Vel Remap = 0.0)	NO	NO	NO	NO	NO	
Velocity (KS Vel Remap = 1.0)	NO	NO	NO	NO	NO	
MIDI CC	CC value <= 26	CC value <= 51	CC value <= 76	CC value <=101	CC value >=102	
Trigger count	NO	NO	NO	NO	NO	
Annotations						

## Key Switches chart (from F# to B)

F#	G	G#	A	A#	B	Note
Harmonics	Note-off sust Hold/Fade/Acc.	Tremolo Off/Slow/Fast	Tremolo Mode	Sordino	2nd page KS Selector (polyphony management)	Parameter Name
Immediately	Immediately	Immediately	Next Note-on	Next STACCATO Note-on	Immediately	Action event
Temporary	Temporary	Temporary	Latch	Latch	Temporary	Latch/Temporary
Off: note-off, OTone1: <= 84, OTone2: >= 85	Hold: note-off, Acc: <= 84, Fade: >= 85	Off: note-off, Slow: <= 84, Fast: >= 85	Hz: <= 42, Sync: <= 84, Sync/Acc: >= 85	Off <= 63, On: >= 64	NO	Velocity (KS Vel Remap = 0.0)
Off: note-off, OTone1: <= 103, OTone2: >= 104	Hold: note-off, Acc: <= 103, Fade: >= 104	Off: note-off, Slow: <= 103, Fast: >= 104	Hz: <= 73, Sync: <= 103, Sync/Acc: >= 104	Off: <= 84, On: >= 85	NO	Velocity (KS Vel Remap = 1.0)
Off: <= 42, OTone1: <= 84, OTone2: >= 85	Hold: <= 42, Acc: <= 84, Fade: >= 85	Off: <= 42, Slow: <= 84, Fast: >= 85	Hz: <= 42, Sync: <= 84, Sync/Acc: >= 85	Off: <= 63, On: >= 64	NO	MIDI CC
1 = Off, 2 = OTone1, 3 = OTone2	1 = Hold, 2 = Acc, 3 = Fade	1 = Off, 2 = Slow, 3 = Fast	1 = Hz, 2 = Sync, 3 = Sync/Acc	1 = Off 2 = On	NO	Trigger count
					Activates the polyphony KeySwitches (see 2nd Page Key Switches table)	Annotations

### 2nd Page Key Switches (poly management)

While 2nd page KS Selector is pressed (B)

B + F#	B + G	B + G#	B + A	B + A#	B	Note
Preferred Strings 4-3		Preferred Strings 3-2		Preferred Strings 2-1	2nd page KS Selector (polyphony management)	Parameter Name
Next Note-on		Next Note-on		Next Note-on	Immediately	Action event
Latch		Latch		Latch	Temporary	Latch/Temporary
NO		NO		NO	NO	Velocity (KS Vel Remap = 0.0)
NO		NO		NO	NO	Velocity (KS Vel Remap = 1.0)
CC value <= 63		CC value <= 95		CC value >= 96	NO	MIDI CC
NO		NO		NO	NO	Trigger count
					Activates the polyphony KeySwitches (see 2nd Page Key Switches table)	Annotations

# Microtuning

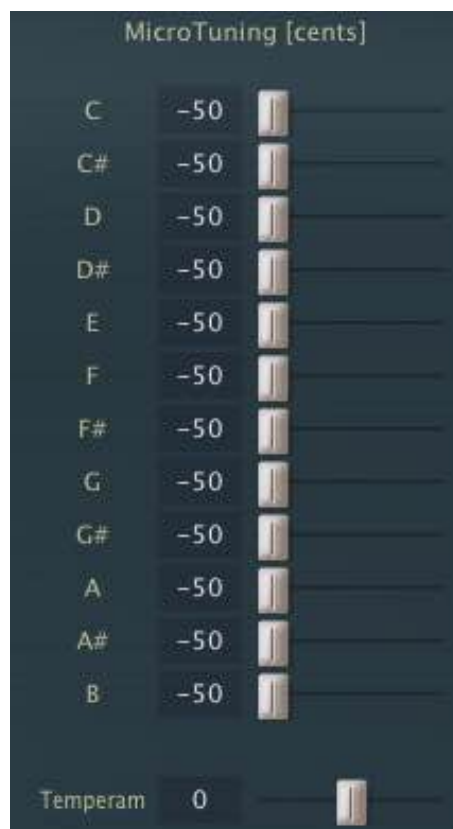


Note: as with real strings instruments, microtuning is applied by the finger position on the strings. Open strings are not affected by the microtuning settings! Choose the appropriate String Tuning ("Str. Tuning" parameter in Options page) and Alternate Fingering ("Alt.Fing" on the main GUI) in order to play the desired microtuned scales.

Our approach to microtuning yields maximal flexibility, providing for user-defined scales, where the extent of detuning (range +100/-100 cents) can be precisely set for each note using a series of sliders. These settings can be saved along with the instrument presets.

Detuning can be applied selectively to individual notes, in real time, using the mouse or key switches.

The default preset is a detuning of -50 cents:



By default, detuning is set, but not yet applied to any given note. To apply detuning, you can choose between two methods:

1. Using the mouse in the instrument GUI
2. Making changes as you go using key switches

The “Temperament” slider, if set higher than zero, 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 further “spaced apart” to produce special effects.

## Applying microtuning using the mouse

This is the simplest method and is suitable for settings that do not need to be changed “on the fly”. To detune a specific pitch, simply click on the microtuning bar in the main instrument GUI. This will apply detuning (set on the Options page by the microtuning sliders) to the chosen note (which is B in the example below):



- Clicking on the bar graph again will switch detuning off.
- Double-clicking anywhere in the bar graph area will switch off detuning for all the notes.

Please note that the above will only work on the main instrument page.

## Applying microtuning using key switches

You can also apply microtuning to notes using key switches. To do this you must first go into Select Note Mode (SNM – see below) and then 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 enter Select Note Mode (SNM)

SNM is activated by sending a suitable CC value above 64. Which particular CC value you choose is left up to you: Go to the Option page and enter the desired CC number in the "MicroTuning (ON OFF)" field. Entering "64" will define the sustain pedal, which is the most suitable option for this task. Pressing and holding down the pedal switches SNM on and highlights the key switches (in blue).

Note: CC64 (sus pedal) is, by default, assigned to Sustain/BowChange (see the OPTIONS page, "NoteOff Sust."). If you are using the sustain pedal for Microtuning, Sustain/BowChange must be assigned to another controller, or to none.

## How to detune selected notes

1. Enter Select Note Mode (SNM) by pressing and holding down the sustain pedal (or send a value greater than 64 via the CC you have assigned for Microtuning); the key switches will turn blue.
2. Press the key switches (evenly and simultaneously) that correspond to the notes you want to detune. The detuned notes will be displayed by the microtuning bar graphs in the Main GUI (see "Microtuning using the mouse" above).
3. Exit SNM 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. Briefly press E1 and B1
3. Release the sustain pedal

The affected notes and how much they have been detuned will be displayed in the instrument GUI:



## How to reset and modify the current microtuning

As soon as you re-enter SNM (by pressing the sus 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 cancelled and the Microtuning display in the instrument GUI will be reset to zero:



Keeping the pedal pressed, you can immediately detune a new set of notes by pressing the appropriate key switches (see 2. above).

This allows you to create selective microtunings as you work.

## 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 the sysex (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 (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

## How to save your microtuning settings

Microtuning settings — except those done “on the fly” with key switches — can be stored and loaded as instrument presets using the Save/Load buttons in the instrument GUI.

# How to perform the main articulations

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

## Détaché

Detaché 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.

There are three types of behavior controlled by the "NoteOff Sust." Parameter [*also mapped to KeySwitch G*]:

- Hold: the first note is sustained by the pedal.
- Acc.: a short accent is performed at the end of the first note, then a fading release occurs.
- Fade: a fading release occurs immediately at the end of the first note.

## Martelé

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

## Legato

### Slurred legato

A pure "slurred" legato is performed 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 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 "Alt.Fing" parameter. Setting the "Alt.Fing" 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 "Port/Leg Speed&Thresh" parameter (also controllable in real-time if mapped to a MIDI CC). The legato transition "quality" is influenced by the "Dynamic Transit." parameter (also controllable in real-time if mapped to a MIDI CC).

## Portamento (glissando)

A glissando between two notes is obtained overlapping the second note to the first, using a low value of note-on velocity for the second note. If the "Port.Time" parameter is set to "CC" just overlap the second note after setting the "Portamento Time" CC value to a low value (unless the MIDI mapping has been inverted using Min > Max in the MIDI mapping page).

The actual portamento time and the threshold between portamento and legato are influenced by the "Port/Leg Speed&Thresh" 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 "Portam. Split Ratio" parameter.

### How to obtain a portamento on the same string (how to avoid split portamento)

In order to obtain a wide portamento on the same string, you need to control the starting and ending position of the finger on the fingerboard acting on the "Alt.Fing" parameter.

To do this in realtime, you need to use the "Alt.Fing" Key Switch D# or control the "Alt.Fing." parameter through a MIDI CC (see MIDI mapping Page).

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 "Alt.Fing" 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 scroll.
3. Set the "Alt.Fing" 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.

## Flautato

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

## Scratch

To obtain a very scratchy sound, just set the BowPressure 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

Just select 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 (expression "spikes" on the desired strokes).

## Manual-tremolo

Be sure that the "Manual Trem/BowC KS" option is set to "Trem"; press and release the Key Switch C# while playing the notes; a bow-change is performed at both note-on and note-off. You can adjust the "BowPressure" in order to obtain a smooth or hard tremolo.

## Bowing

Set the Gesture Mode to Bowing and move your expression controller back and forth.

# Crescendo

Standard Crescendo: Crescendo is performed acting just on the Expression, starting from a low value and increasing it as desired.

Wider Crescendo: A wider effect can be obtained mapping the Bow Pressure parameter to the same CC that controls the Expression (see "MIDI mapping Page", page 16). 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), increase the Expression as desired.

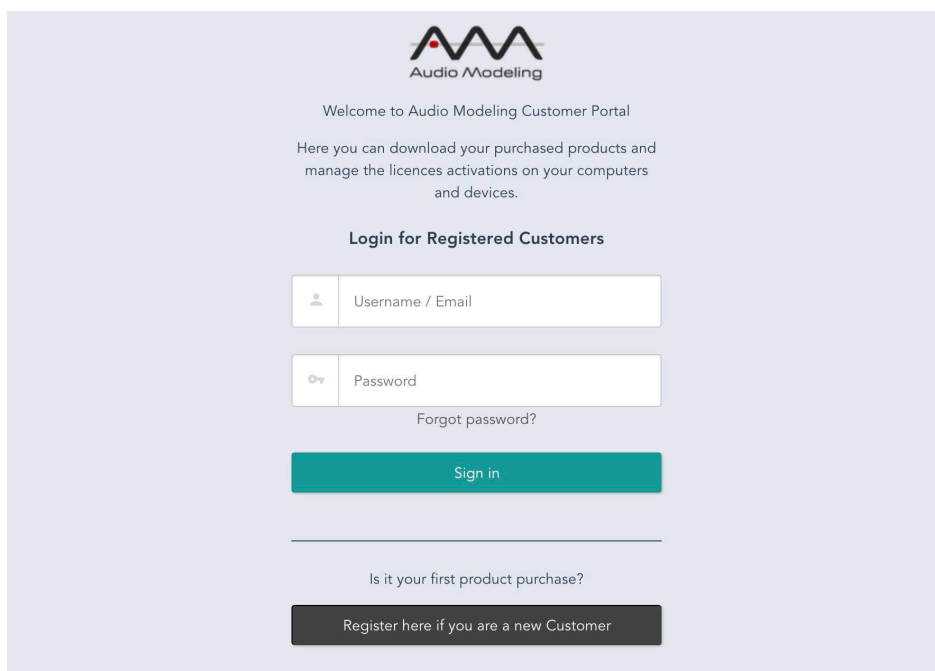
# Licensing

The License Key we provide can be activated twice. Each activation is possible on a computer only. Refer to the Installation Guide for instructions on how to authorize SWAM products.

For moving an authorization to a different computer, go to the Customer Portal at <https://my.audiomodeling.com/> and delete it from activations list of the corresponding License Key.

## Customer Portal

Login to the Customer Portal at <https://my.audiomodeling.com/> to manage your License Keys, Downloads and Activations.



The screenshot shows the Audio Modeling Customer Portal login interface. At the top center is the Audio Modeling logo, which consists of a stylized 'M' with a red dot above it and the text 'Audio Modeling' below. Below the logo, the text reads: 'Welcome to Audio Modeling Customer Portal' followed by 'Here you can download your purchased products and manage the licences activations on your computers and devices.' Underneath this is the heading 'Login for Registered Customers'. There are two input fields: the first is labeled 'Username / Email' and the second is labeled 'Password'. Below the password field is a link that says 'Forgot password?'. A teal 'Sign in' button is positioned below the input fields. A horizontal line separates the login section from the registration section. Below the line, the text asks 'Is it your first product purchase?' and there is a dark grey button labeled 'Register here if you are a new Customer'.

If you have never accessed the Audio Modeling Customer Portal, create a new account following the instructions at <https://my.audiomodeling.com/register>

# Technical Support

Before requesting technical support, please make sure that you have carefully read the User Manual and the FAQs on our Support Center: <https://support.audiomodeling.com/kb>

There you will quickly find appropriate answers to most questions.

Should you still need support, please contact the SWAM support at [support@audiomodeling.com](mailto:support@audiomodeling.com) or open a Ticket through the Support Center: <https://support.audiomodeling.com>



Note: Please ensure that you enter your email address carefully — it is not possible to reply to an incorrect email address!

When requesting technical support, please do not 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.

Please include a reference to either the order number or one of the License Keys.

\* \* \*

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engine

by



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