

SWAM VariFlute User Manual

v1.0.0





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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 the Audio Modeling website at audiomodeling.com/media, and on the 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.

More information, tips, FAQ and troubleshooting at kb.audiomodeling.com.

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

The Desktop version will function on any modern computer (see [Specifications](#)), using any host application which supports VST, VST3, Audio Units or AAX plug-in formats, or running as a standalone application. An example host software could be a sequencer or a Digital Audio Workstation (DAW) such as Camelot Pro, Ableton Live, Cubase, Logic, Pro Tools, LUNA, Reaper, Digital Performer, Studio One, etc.

The iOS version is currently available for both iPad and iPhone (see [Specifications](#) to check what OS version is supported). On this mobile platform, SWAM products come as Standalone, AUv3 plug-ins and Inter-App Audio (IAA) formats. Example host and DAW software are Camelot Pro, GarageBand, Logic Pro, Cubase and AUM.

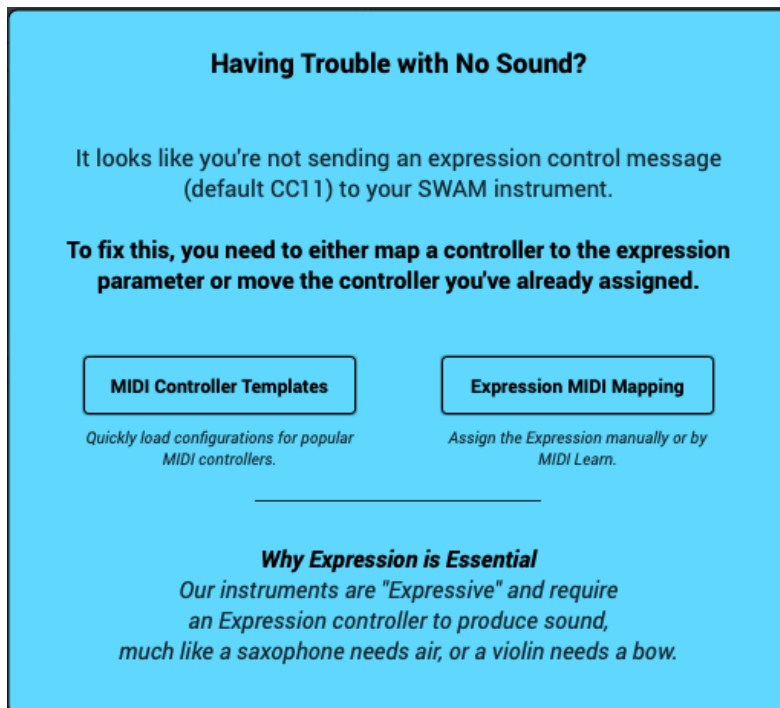
These instruments use Audio Modeling's proprietary SWAM (Synchronous Wave Acoustic Modeling) technology conceived by Stefano Lucato. Combined with Physical Modeling, they provide exceptional playability and realism. The sound is not produced by playing back samples, using pre-recorded articulations; these are complex virtual instruments, capable of shaping almost any kind of articulation and phrasing in real time. They can be played using any MIDI device such as a keyboard, breath or wind controller.

Indeed, it is essential that the instruments are controlled using a suitably capable set of [MIDI controllers](#), as described in this manual.

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

To accomplish this, it's necessary to use a suitable continuous physical MIDI controller such as an expression or volume pedal (usually CC11 or CC7 MIDI messages), a breath or wind controller (usually CC2 MIDI messages) or one of the many other expressive controllers on the market today.

WITHOUT SUCH A CONTROLLER, THE INSTRUMENT [WILL NOT WORK](#) WHEN PLAYED IN REALTIME. Instead, it will display the warning "Having Trouble with No Sound? It looks like you're not sending an expression control message (default CC11) to your SWAM instrument", with actions to select or [map an external MIDI controller](#).



Having Trouble with No Sound?

It looks like you're not sending an expression control message (default CC11) to your SWAM instrument.

To fix this, you need to either map a controller to the expression parameter or move the controller you've already assigned.

MIDI Controller Templates
Quickly load configurations for popular MIDI controllers.

Expression MIDI Mapping
Assign the Expression manually or by MIDI Learn.

Why Expression is Essential
Our instruments are "Expressive" and require an Expression controller to produce sound, much like a saxophone needs air, or a violin needs a bow.

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 Expression 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 login 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 Paths](#)" paragraph of this user manual to locate the EULA on your system.

iOS

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



Specifications

macOS 10.13 (High Sierra) – 26 (Tahoe)*

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

Windows 10, Windows 11

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

iOS 12 – 26

- Standalone, AUv3, IAA

** Apple Silicon architecture supported natively*

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

Required space

macOS

The product installer is 103 MB. The space needed for installation is ~260 MB. About 160 MB of RAM are used for each instrument instance.

Windows

The product installer is 58 MB. The space needed for installation is ~100 MB. About 145 MB of RAM are used for each instrument instance.

Installation

macOS and Windows

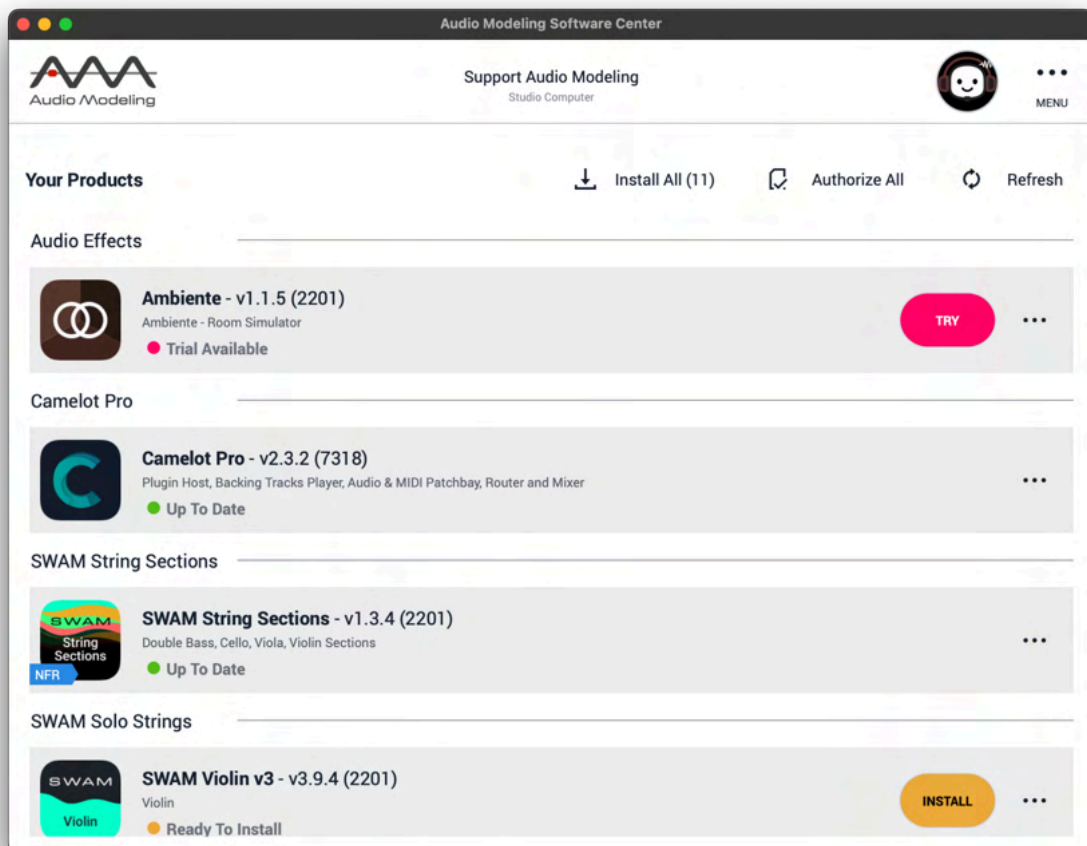
Product Registration and Installation

- 1) login to our Customer Portal (<https://my.audiomodeling.com>); create a new account if you have never signed up;
- 2) select "Register" under the "Products" menu item;
- 3) type the License Key or Redeem code provided, select "Continue";
- 4) download, install and launch the "Audio Modeling Software Center", available both on the Customer Portal and 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/(Product name)
- Audio Units plug-ins are located under: /Library/Audio/Plug-Ins/Components
- VST3 plug-ins are located under: /Library/Audio/Plug-Ins/VST3
- VST plug-ins are located under: /Library/Audio/Plug-Ins/VST
- AAX plug-ins are located under: /Library/Application Support/Avid/Audio/Plug-Ins
- Default presets and auxiliary resources are stored under: /Users/Shared/Audio Modeling/AMData
- User presets are stored under: ~/Library/Audio Modeling/AMData

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\ (Product name)
- 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
- Default presets and auxiliary resources are stored under: C:\Users\Public\Documents\Audio Modeling\AMData
- User presets are stored under: %AppData%\Audio Modeling\AMData

iOS

Installation and updates are managed through the AppStore.



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 1.6 GHz Core 2 Duo CPU for a single instance of any SWAM instrument. 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 64, 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.

NOTE: sample rate values lower than 44.1 kHz are not supported.

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, YDS-120 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, LUMI 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 and Osmose 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 the 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 this instrument, please check the [Installation Paths](#) paragraph of this User Manual to locate the applications.

Plugins

A DAW (Digital Audio Workstation) or other host capable of running VST2.4, VST3, Audio Units or AAX plugins is needed to run the SWAM instrument. 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 Free for desktop (camelotpro.com).

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

iOS

Standalone

We provide a Standalone App of SWAM VariFlute.

Plugins

A DAW (Digital Audio Workstation) or other host capable of running SWAM instruments as AUv3 or IAA plugins is needed.

If you do not have a host application capable of running AUv3 plugins, you can get our Camelot Pro live performance host on the AppStore.

Using an appropriate range of Expression

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

All real physical instruments require a much greater degree of effort to achieve the highest possible dynamics for that instrument. This is not the case for most physical MIDI controllers; it is indeed very easy to push an expression pedal, or a slider, to the maximum and leave it there forever. Oddly enough, even breath and wind controllers tend to jump very easily to the highest dynamics (unless carefully set), so that the most expressive range (*mp* to *mf*) is seldom exploited. This results all too often in the virtual instrument being played in an excessive range of dynamics, leading unavoidably to a poor, unrealistic performance.

Please keep in mind that the key to expressiveness and realism is a proper use of dynamics. Always monitor the input expression value on the main display and adjust the dynamics accordingly. A useful trick is to set the overall monitoring volume fairly high. This automatically prevents any inclination toward overusing 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

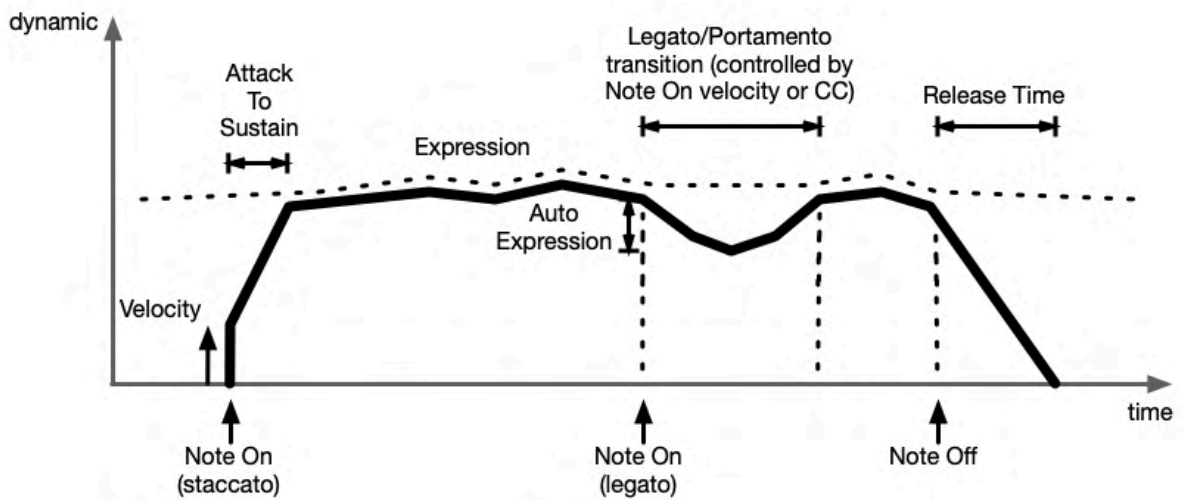
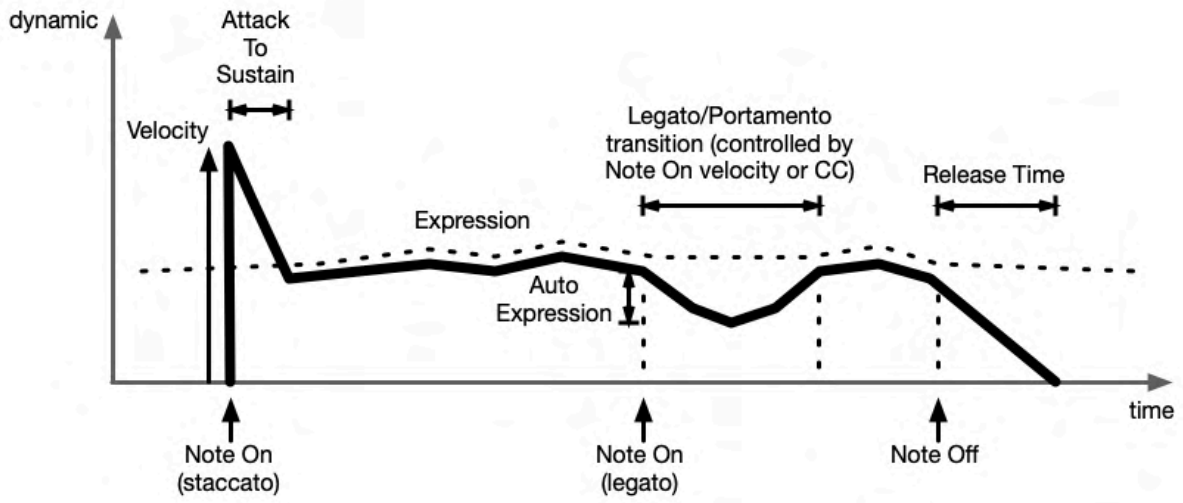
SWAM Discovery is a collection of virtual instruments designed to explore and extend the expressive potential of physical modeling synthesis. It aims to make the benefits of this synthesis technique accessible to a wide audience of musicians, producers, and sound designers worldwide: those seeking more than playback realism, and instead craving real-time interaction and subtle nuance.

SWAM VariFlute is the first instrument in this series. Conceived and developed by Stefano Lucato and the Audio Modeling team, it is based entirely on physical modeling synthesis. As its name suggests, VariFlute is a “variable” flute: not a replica of a specific acoustic model, but a general-purpose aerophone that can mimic a wide variety of real-world flutes, or morph into hybrid, previously unimagined designs. Its identity is not fixed, but shaped by user-defined acoustic parameters, making it equally suitable for traditional, experimental, and cross-genre applications.

The instrument features all standard articulations expected in a performance-ready virtual flute, including staccato and legato transitions, configurable via velocity or portamento time controlled by MIDI CC. Dynamic expression, vibrato depth, and vibrato frequency are all continuously variable and highly responsive to input. Beyond these basics, VariFlute provides a range of advanced controls that directly influence core acoustic behaviors, such as the intensity of breath stream, the embouchure stability, turbulence response, and harmonic excitation.

These parameters allow performers to simulate not only different instruments, but also different playing styles, cultural traditions, and even physical conditions, ranging from precise classical articulations to unstable, breath-driven effects typical of ethnic flutes or experimental improvisation. The goal is not to imitate a single instrument, but to provide a playable, expressive environment where sound responds like a real acoustic object.

SWAM VariFlute natively includes Ambiente, a sophisticated room simulator and spatializer that positions instruments within a 3D virtual space. It accurately simulates the reflections of sound waves from the instruments within this space through geometric reflection calculations. It also takes into account the absorption properties of the room's materials and its size, offering a realistic spatial experience rather than a mere reverb effect.



Interaction with the product

You can control the parameters of SWAM instruments directly through the user interface (UI) using a mouse, finger on touch devices, or other pointing systems like Eye Trackers or OCR. Additionally, interaction is possible via Screen Reader, [keyboard shortcuts](#), or [MIDI](#) for parameters that are mappable and effectively mapped. All SWAM products have been validated by visually impaired users for a high level of accessibility.

Parameters are graphically represented by knobs, sliders, button rows with all options explicitly listed, or toggle buttons.

The interface is designed for various uses on different screen sizes, devices, and operating systems. The [Main "... menu](#) on the home screen acts as a guided wizard that provides access to almost all functions.

Next to each object, the contextual "... menu offers access to the most important and contextual options, encouraging users to explore further.

System parameters are categorized on the home screen into different groups to make it easier for less experienced users or infrequent users to understand and get started. However, the experienced and frequent user has access to the [Search](#) button located at the top of the header. This tool provides at the same time an overview of all parameters and a search function to quickly find what is not immediately visible.

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: if the Ambiente Room Simulator parameter is set to ON, Room & Position opens Ambiente, the virtual room and positioning environment; otherwise, it shows the parameters affecting the audio signal processing applied at the final stage.

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

Main controls

- Instrument – Tube Type: use the arrows to select the type of pipe emulation:
 - Holes - Open Pipe: notes are achieved by covering holes on the pipe's body and triggering different harmonic modes
 - Slide - Closed Pipe: notes are achieved by changing the length of the resonant section in a sliding manner, like a *coulisse* would.
 - Multi Pipe - Closed Pipe: notes are achieved by exciting a different pipe for each note
- Flutter Tongue: controls the intensity of flutter-tonguing – a technique where the player moves their tongue rapidly, producing a growling or 'rolling-r' effect.
- Breath Noise: breath noise intensity
- Aperture (Harmonic Balance): spectral characteristics of the instrument – balance between odd and even harmonics.
- Pipe Resonance (Material): changes the internal resonance of the pipe, emulating different pipe construction materials.
- Hi Frequency Eq: Equalizer reference frequency for high frequency processing.
- Hi Frequency Eq Boost: Equalizer gain boost.
- Pipe Length: changes the base intonation of the instrument – the length of the pipe, thus its range
- Pipe Diameter: changes the diameter of the pipe, thus its modal characteristics and static resonances


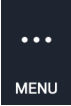
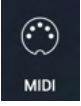
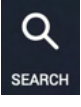
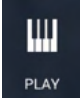
- RESET:
 - Initialize: reset the instrument and return to its initial state; this includes sound engine, MIDI mapping, micro tuning and room

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

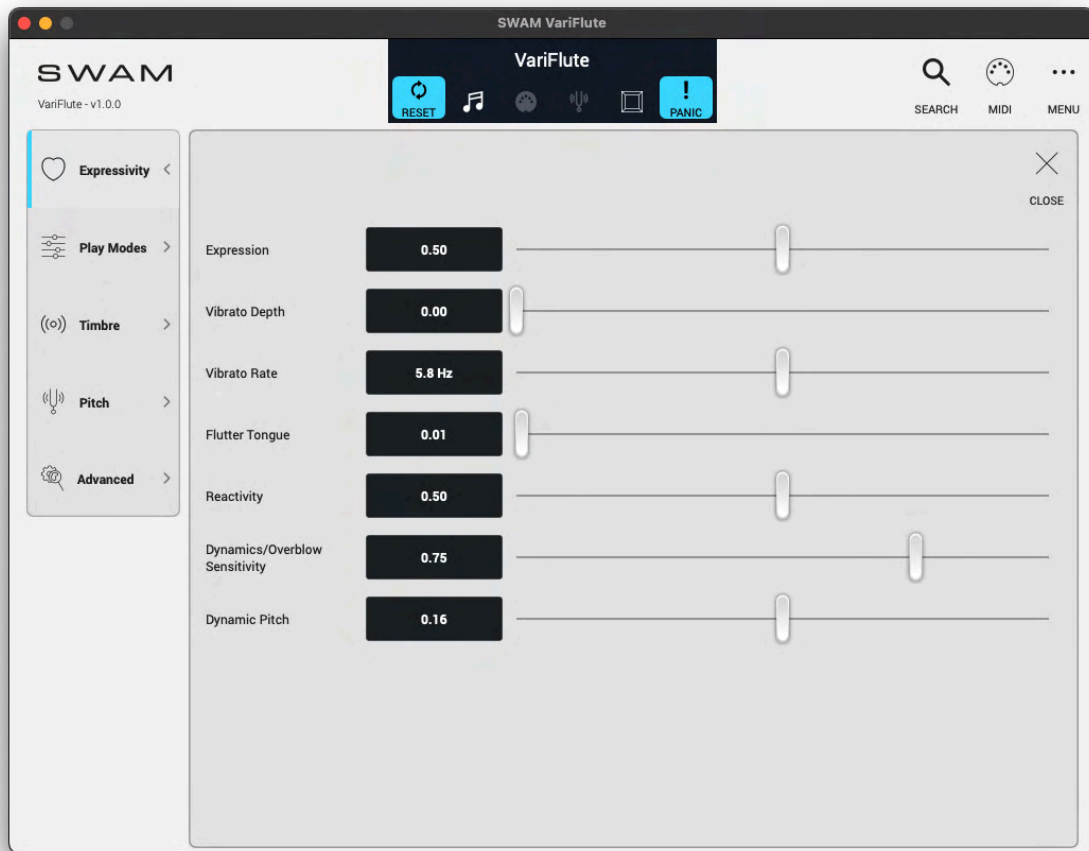
Audio section

- Room & Position: if the Ambiente Room Simulator parameter is set to ON, Room & Position opens Ambiente, the virtual room and positioning environment; otherwise, it is grayed out. It is recommended to take advantage of the room simulator by keeping the parameter set to ON (located in the Advanced / ROOM page).
- Main Volume: main output volume. This can be either 'Pre Room' or 'Post Room', depending on the 'Main Volume Processing' parameter located in the Advanced / ROOM page. Selecting 'Pre Room' means the main volume will only affect the source signal, leaving the room ambiance unaltered. Conversely, selecting 'Post Room' means the main volume will affect the overall output, including both the source signal and the room ambiance.

Header section

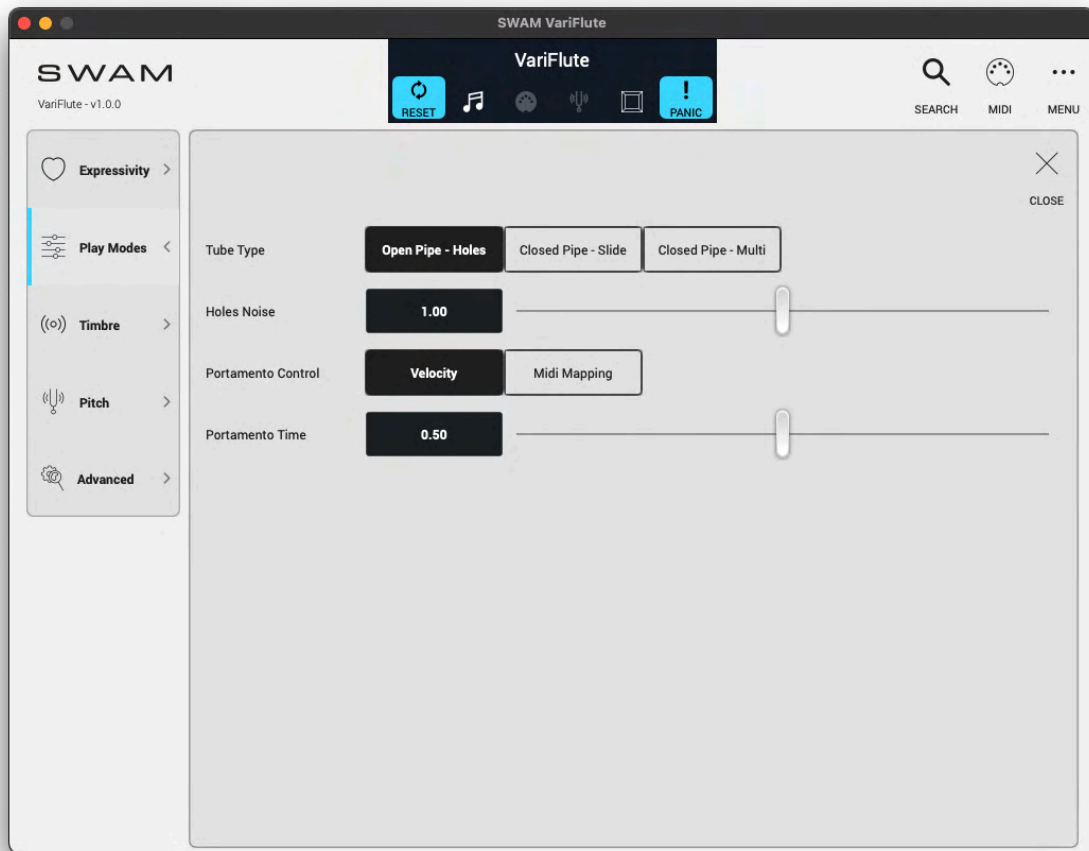
- SWAM logo : selection of the SWAM logo open the About section
- Main menu icon : opens the main menu page that provides access to:
 - Save & Load
 - Reset
 - Controller Mapping
 - Parameter Lock
 - Import
 - Export
 - Settings
- MIDI Mapping icon : opens MIDI mapping management section.
- SEARCH icon : opens the search screen for browsing parameters all at once with a big picture of the entire system.
- Playing Surface icon (only for iPadOS version) : open the playing surface for playing the instrument on the iPad glass.
NOTE: on iPhone, the playing surface is available rotating the device to landscape orientation.

Expressivity



- Expression: main expressive control. It represents how hard the player is blowing into the physical model, i.e. the breath intensity.
- Vibrato Depth: controls the amount of vibrato. Vibrato is modeled as rapid changes to the breath intensity.
- Vibrato Rate: controls the average frequency of the vibrato applied to the model.
- Flutter Tongue: controls the intensity of flutter-tonguing – a technique where the player moves their tongue rapidly, producing a growling or 'rolling-r' effect.
- Reactivity: amount of harmonic transition enhancement. For example, natural pipe harmonic triggering during attacks or fast dynamic changes.
- Dynamics/Overblow Sensitivity: how easily the pipe harmonics engage on high dynamics.
- Dynamic Pitch: amount of pitch modulation applied while changing the dynamics

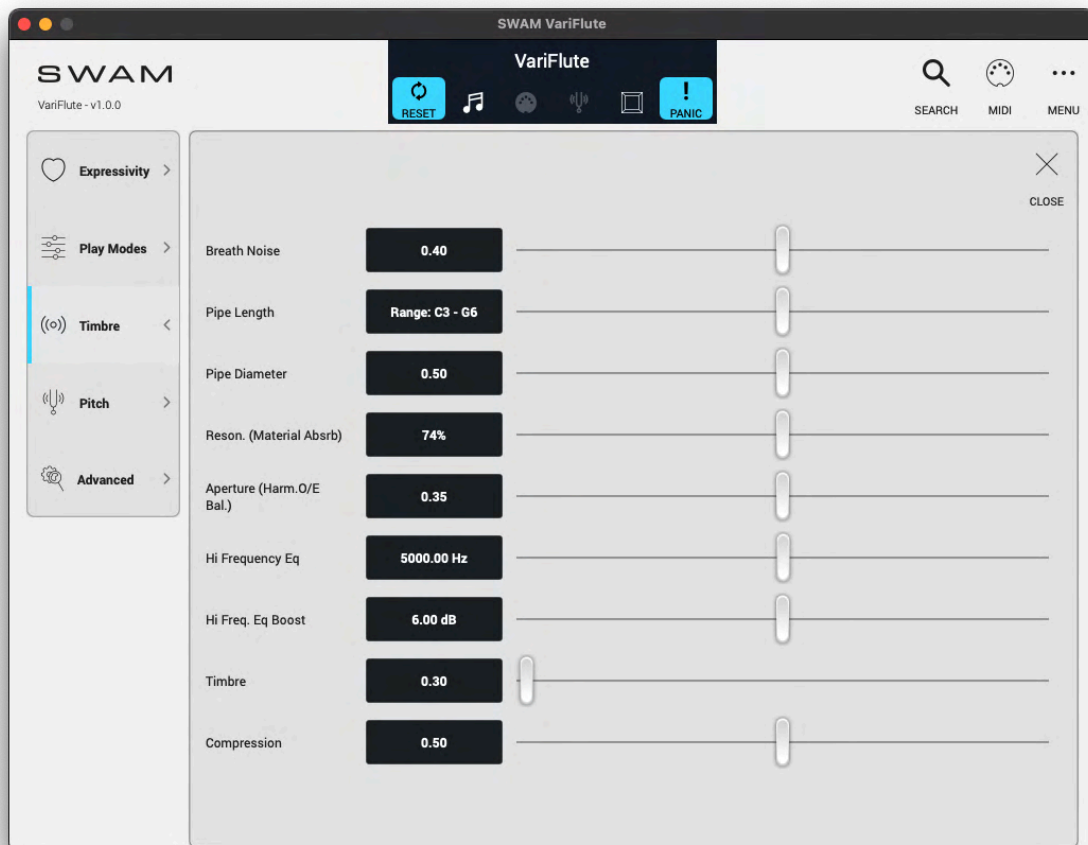
Play Modes



- Tube Type: use the arrows to select the type of pipe emulation:
 - Holes - Open Pipe: notes are achieved by covering holes on the pipe's body and triggering different harmonic modes
 - Slide - Closed Pipe: notes are achieved by changing the length of the resonant section in a sliding manner, like a *coulisse* would.
 - Multi Pipe - Closed Pipe: notes are achieved exciting a different pipe for each note
- Holes Noise (only for Holes tube types): attack noise intensity on a note change
- Portamento Control (only for Holes and Slide tube types):
 - Velocity: the portamento time is controlled by the note on velocity of overlapping notes.

- Midi Mapping: the portamento time is controlled by a MIDI Continuous Control (such as Control Change, AfterTouch, NRPN)
- Portamento Time (only for Holes and Slide tube type): controls the portamento time; set to OFF to disable portamento.

Timbre

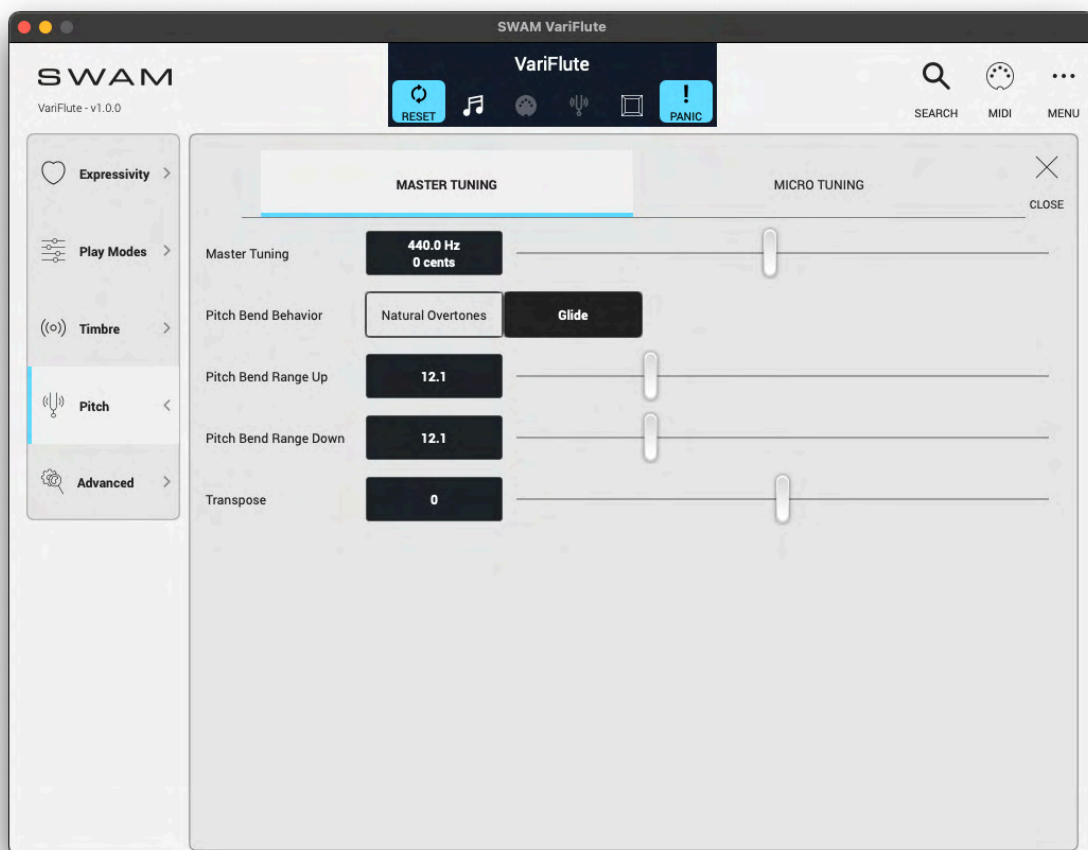


- Breath Noise: breath noise intensity
- Pipe Length: changes the base intonation of the instrument – the length of the pipe, thus its range
- Pipe Diameter: changes the diameter of the pipe, thus its modal characteristics and static resonances.
- Pipe Resonance (Material): changes the internal resonance of the pipe, emulating different pipe construction materials.

- Aperture (Harmonic Balance): spectral characteristics of the instrument – balance between odd and even harmonics.
- Hi Frequency Eq: Equalizer reference frequency for high frequency processing.
- Hi Frequency Eq Boost: Equalizer gain boost.
- Timbre: changes the formants, and thus the overall timbre, of the instrument.
- Compression: dynamic compression and coloring amount.

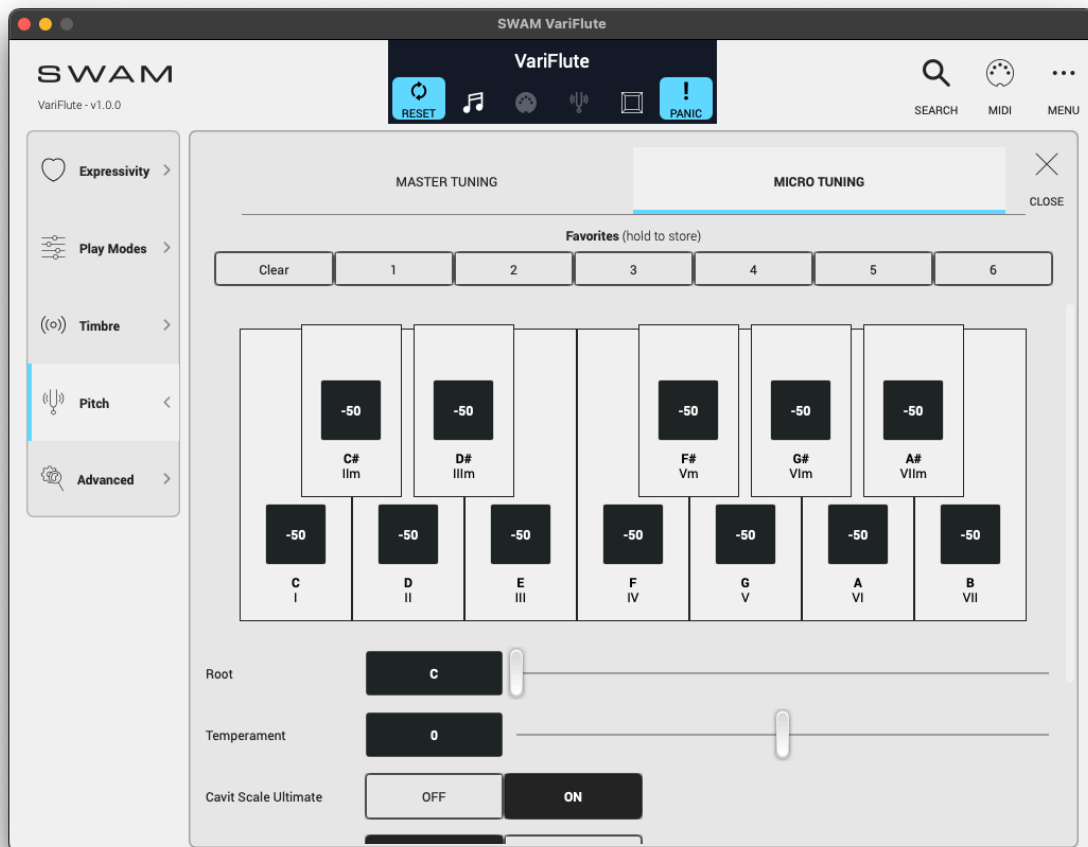
Pitch

Master Tuning



- Master Tune: master tuning of the instrument displayed both in *Hz* and *cents*.
- Pitch Bend Behavior:
 - Natural Overtones: the bent pitch will polarize on the natural modes of the model, making it easy to traverse different overtones
 - Glide: a pitch bend behaving in a classic sliding manner
- Pitch Bend Up: the maximum amount of upward pitch bend, in *semitones*.
- Pitch Bend Down: the maximum amount of downward pitch bend, in *semitones*.
- Transpose: the amount to transpose the instrument, in *semitones*

Micro Tuning



- Favorites: it is possible to store up to seven different settings. Click and hold the preset slot to store the current configuration; click on any preset slot to recall the preset. Click on the Clear button to reset the current configuration to the default state

- Micro Tuning 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 the micro tuning 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.”

- 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 – mazelatoys.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 micro tuning 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 plugin.
- MAQAM Transpose:
 - Note: control keyboard transpose.
 - Root: control micro tuning transpose.
- Microtuning KS:
 - 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.



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

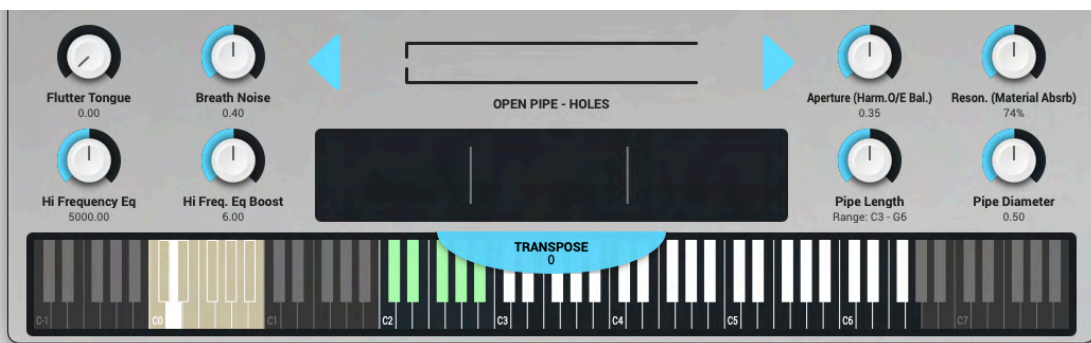
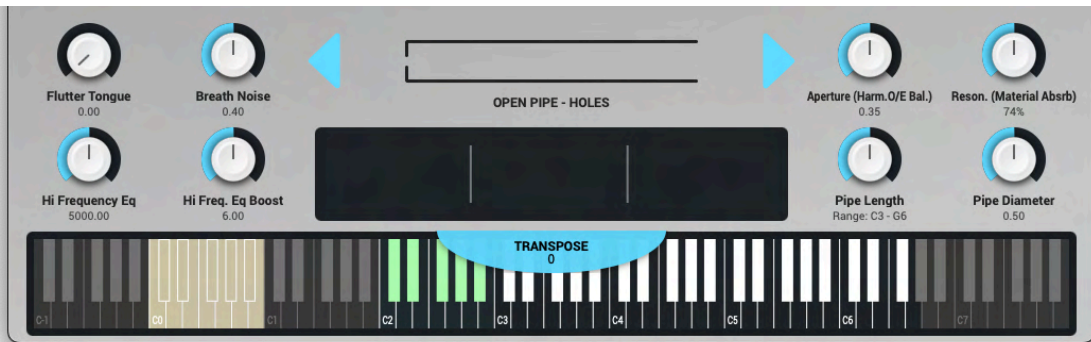
You can also apply microtuning to notes using key switches. To do this you must first go to Advanced -> MIDI and enable the key switches using the "KS Octave" parameter.

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.



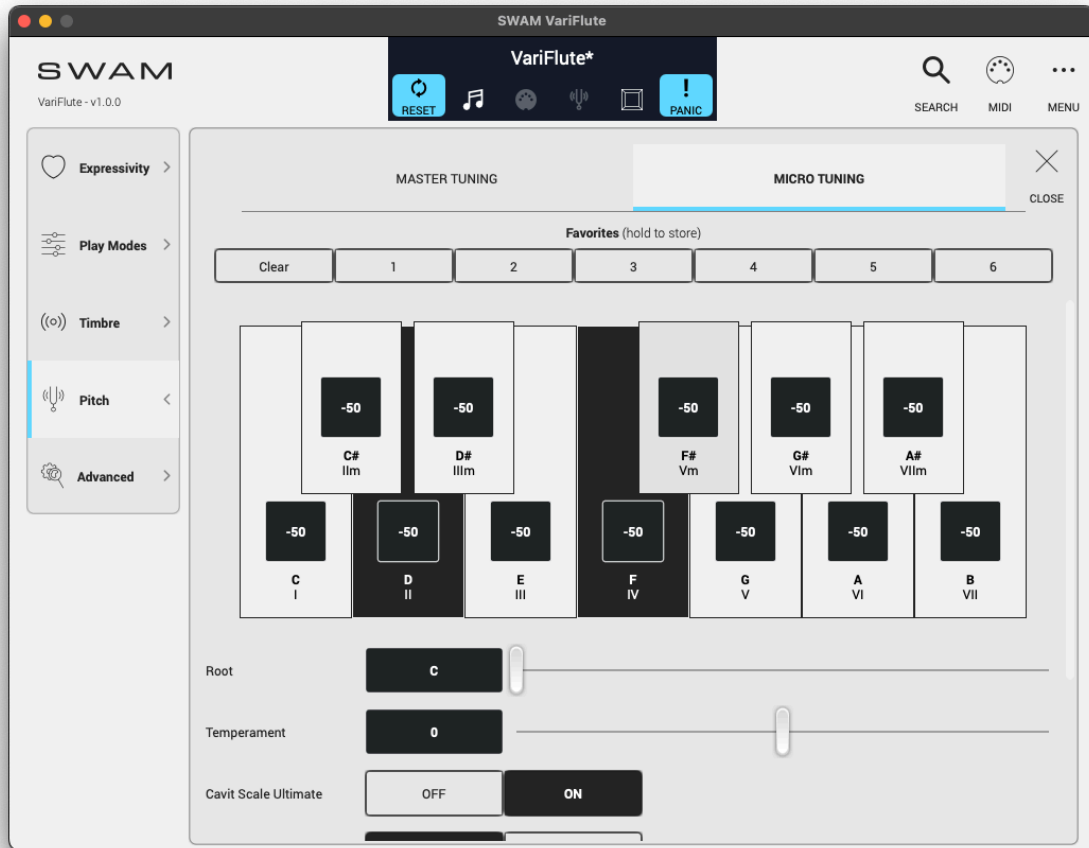
How to detune selected notes

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.

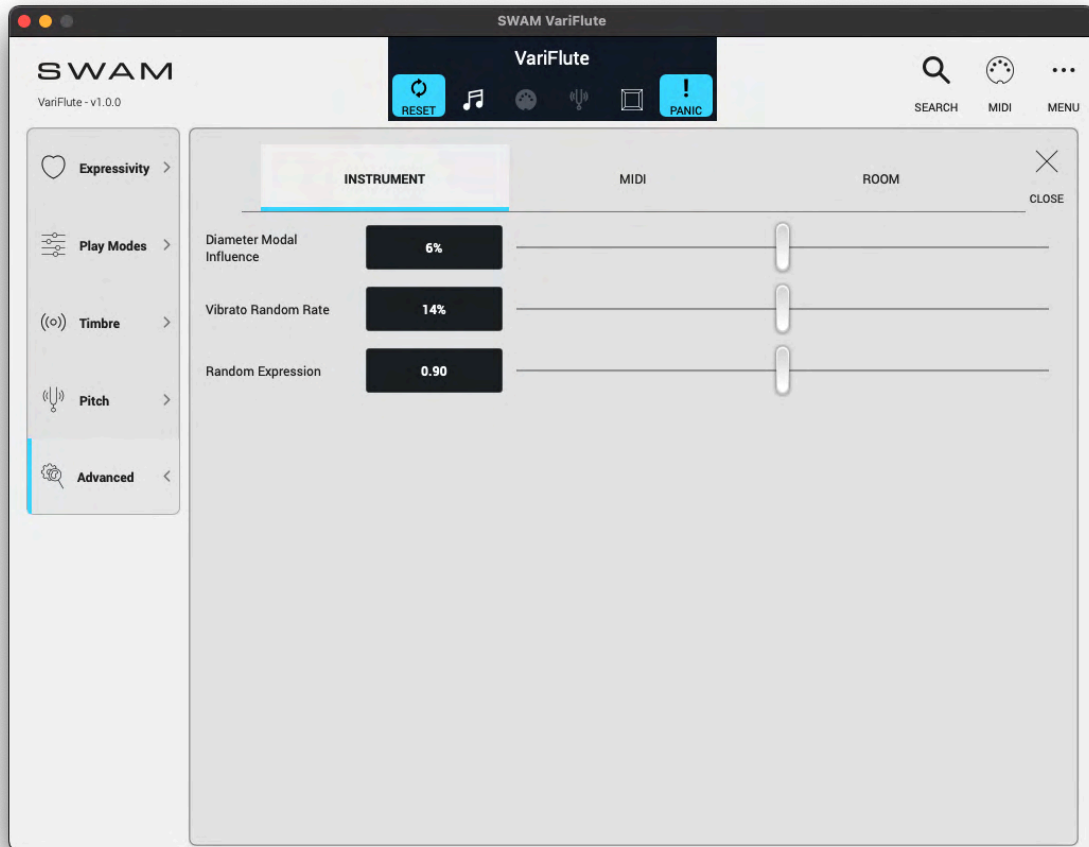
If you don't want to reset the microtuning every time you re-enable Microtuning KS set "Reset Microtuning KS" parameter to OFF.

Microtuning Templates

From the Main “...” Menu and Preset Manager it is possible to Save and Recall Microtuning Templates. A list of Factory Microtuning Templates is provided.

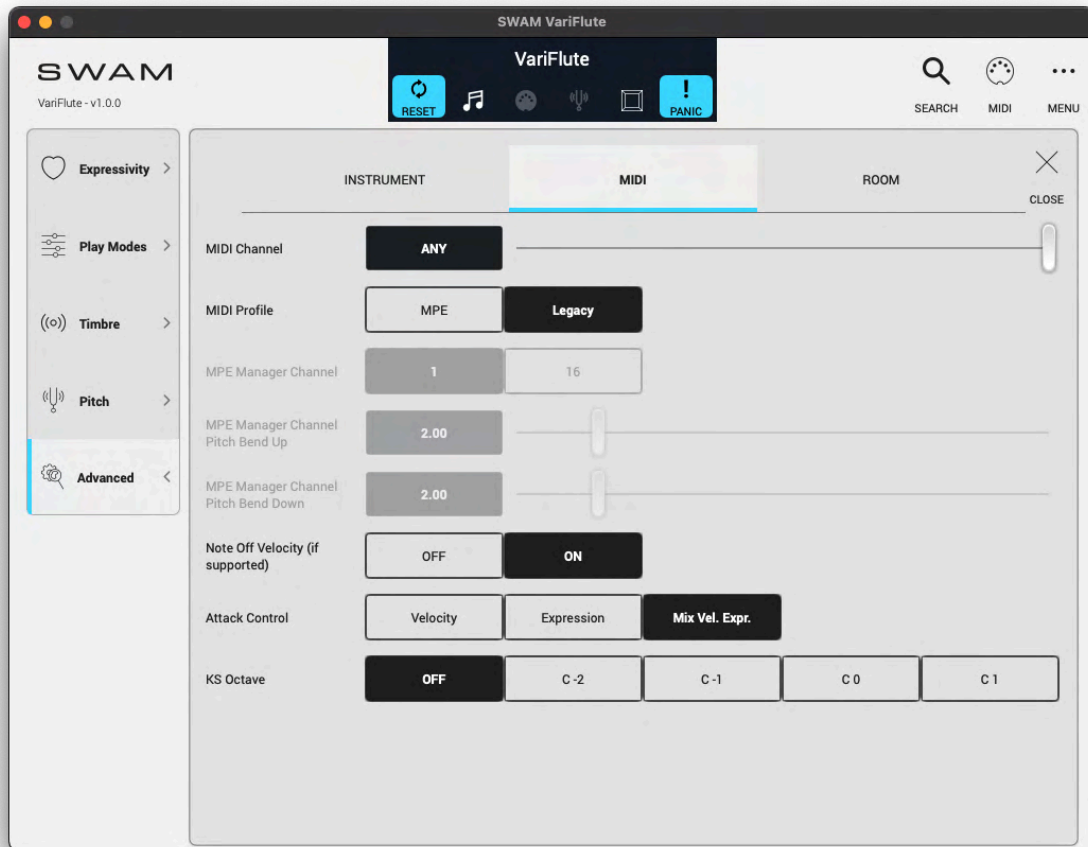
Advanced

INSTRUMENT



- Diameter Modal Influence: controls the pipe's diameter influence over the triggering of different harmonics.
- Vibrato Random Rate: random modulation of vibrato rate
- Random Expression: random modulation of dynamics.

MIDI

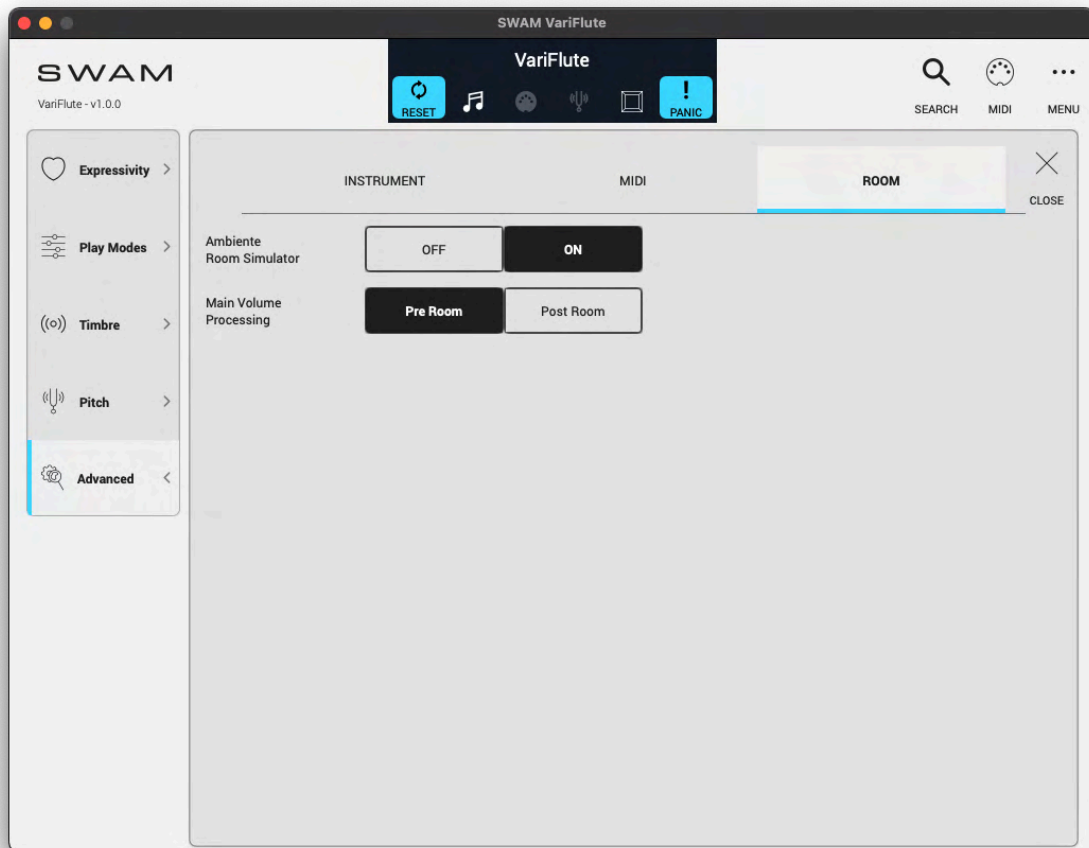


- **MIDI Channel:** is the MIDI channel over which the sound generator receives notes and controllers that affect the sound (default is ANY). For MPE Devices this is forced to ANY.
- **MIDI Profile:**
 - MPE: for MIDI Polyphonic Expression compatible devices.
 - Legacy: MIDI 1.0 devices.
- **MPE Manager channel:** select the manager channel for MPE mode
- **MPE manager channel pitch bend range up:** select the range of the manager channel's upward pitch bend, in semitones
- **MPE manager channel pitch bend range down:** select the range of the manager channel's downward pitch bend, in semitones



- 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:
 - Velocity: controlled by the note-on velocity
 - Expression: controlled by the shape of expression control
 - Mix Velocity-Expression: controlled by both parameters

ROOM



- Ambiente Room Simulator:
 - OFF: Disables Ambiente. This option is recommended if you already have projects using that reverb or a third party external reverb.
 - ON: Activates Ambiente, the onboard virtual room and position engine. This option is recommended to get the most realistic sound for each instrument that is located in the same room.
- Main Volume Processing:
 - Pre Room: the volume control is applied to the sound source, but not to the virtual room. This ensures that reverb is not affected by eventual volume automation.
 - Post Room: the volume control is applied to the sound signal after the virtual room processing. In case of volume control, reverb is also affected.

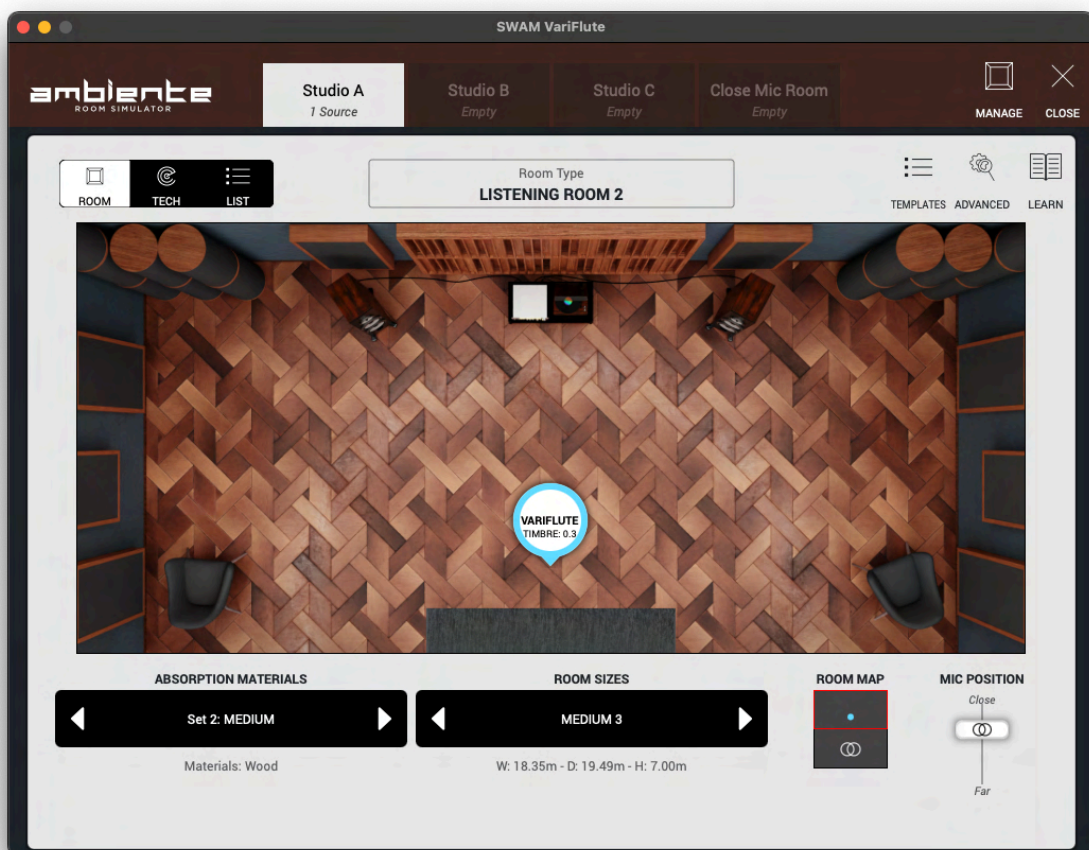
Room & Position

Only visible when Ambiente Room Simulator in ON (Advanced Settings / Room)

All SWAM instruments come equipped with the revolutionary Ambiente room simulator. This significant evolution allows SWAM instruments to "talk" to each other and share the same virtual room. Unlike a simple reverb, Ambiente is a sophisticated spatializer that lets you place instruments in specific locations within a virtual space.

With Ambiente, you can utilize up to four distinct rooms simultaneously. Three of these rooms are fully customizable, allowing you to choose room size, materials, and microphone distance. The fourth room is designed for close-miking all sources, enabling seamless integration with third-party spatializers or external reverbs.

Each SWAM instance communicates with others, sharing room and instrument position information. This means you can manage this functionality from any SWAM instrument without opening each one individually. Communication is handled through a local network protocol, so no internet connection is required, but certain technical requirements must be met. For more details, please refer to the [Global Settings](#) paragraph.





Using the Ambiente room simulator

Overview of the Interface

In the Ambiente room simulator, you will find four tabs at the top of the interface representing the four available rooms. The first three tabs correspond to the customizable rooms, while the last tab represents the "Close Mic" room. To select a room, simply click on the corresponding tab.

Header Controls

In the header, at the top right corner, there are two important buttons:

- **Manage:** This button allows you to manage the current room, including renaming the room and moving instruments to this or other rooms.
- **Advanced:** reveals additional room customization options.
- **Close:** This button closes the room simulator and returns you to the main instrument view.

Options in the Advanced page

- **Reverb Modulation:** when set to ON, reverb has a lush, 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.



Main Screen Views

The main screen offers three views for managing your instruments:

- **Room View:** This graphical interface represents the room as viewed from above. You can drag and drop instruments to position them within the space.
- **Tech View:** For precise positioning, Tech View shows scaled dimensions, allowing for accurate placement and size visualization. Room dimensions and heights are displayed, with concentric guides marking distances from the room center. The dashed area indicates allowable source placement. Vertical scrolling is available via buttons on the right side, while microphone positioning is controlled from the bottom.
- **List View:** This list-based interface allows for easier management of instrument positions, particularly useful for screen reader users.

Room Type Selector and Room Customization

Above the main view, you will find the Room Type selector, which lets you choose from up to 18 different room types. These types are derived from combinations of parameters such as absorption materials and room size, which can be adjusted in the lower section of the interface.

Room Map and Microphone Distance

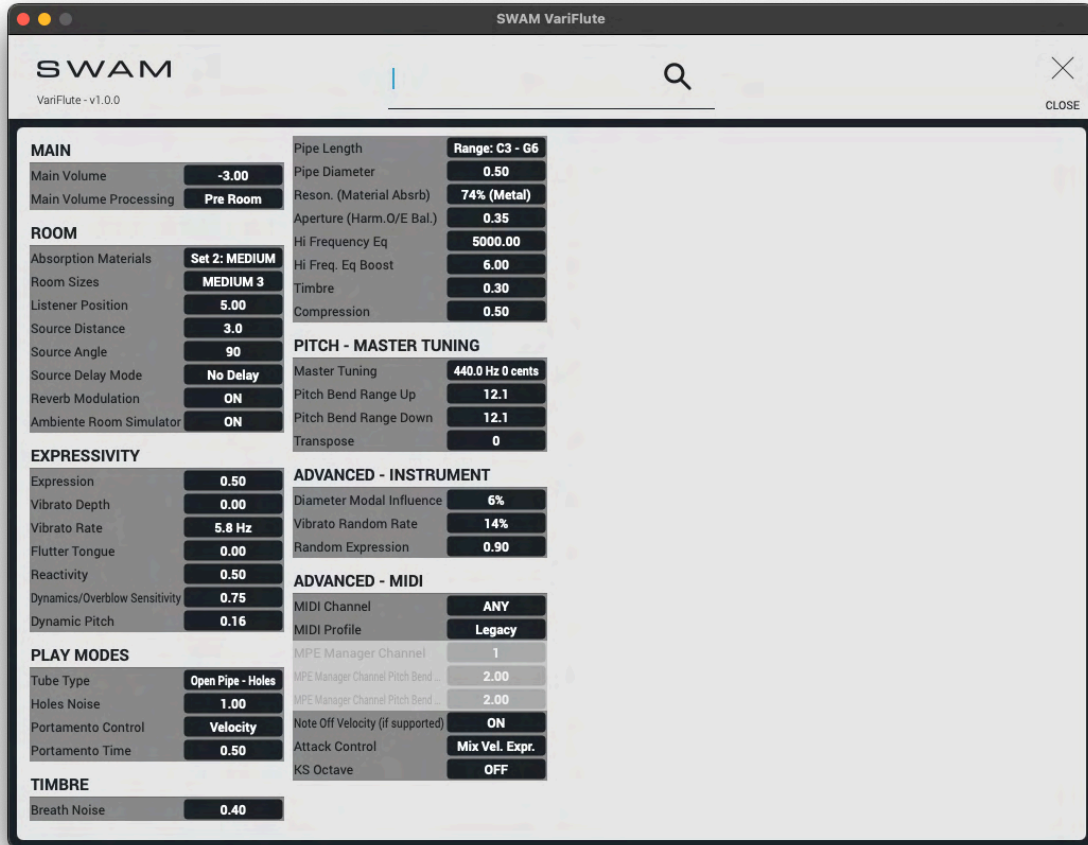
In the lower section, you'll find the room map, a small representation of the room showing the distance from the stereo recording microphone. You can adjust the microphone distance using the fader located to the right of the room map.

Templates Shortcut

A shortcut to the Templates section is available for quickly loading preset room and microphone configurations, whether they are Factory presets or user-defined settings.

With these features, the Ambiente room simulator provides a powerful and flexible environment for positioning your instruments, enhancing your workflow, and unleashing your creativity.

Search



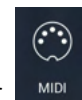
The Search view has been created to improve the experience to beginners, experts and visually impaired users. Beginners can find any parameter by a handy search feature without the need to browse all sections. For expert users, it offers a streamlined page where all parameters can be easily located, 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.

Start typing in the search field, and matching results will be highlighted. Clicking or tapping on a parameter will open a popup window with the edit controls.

Controller Mapping

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



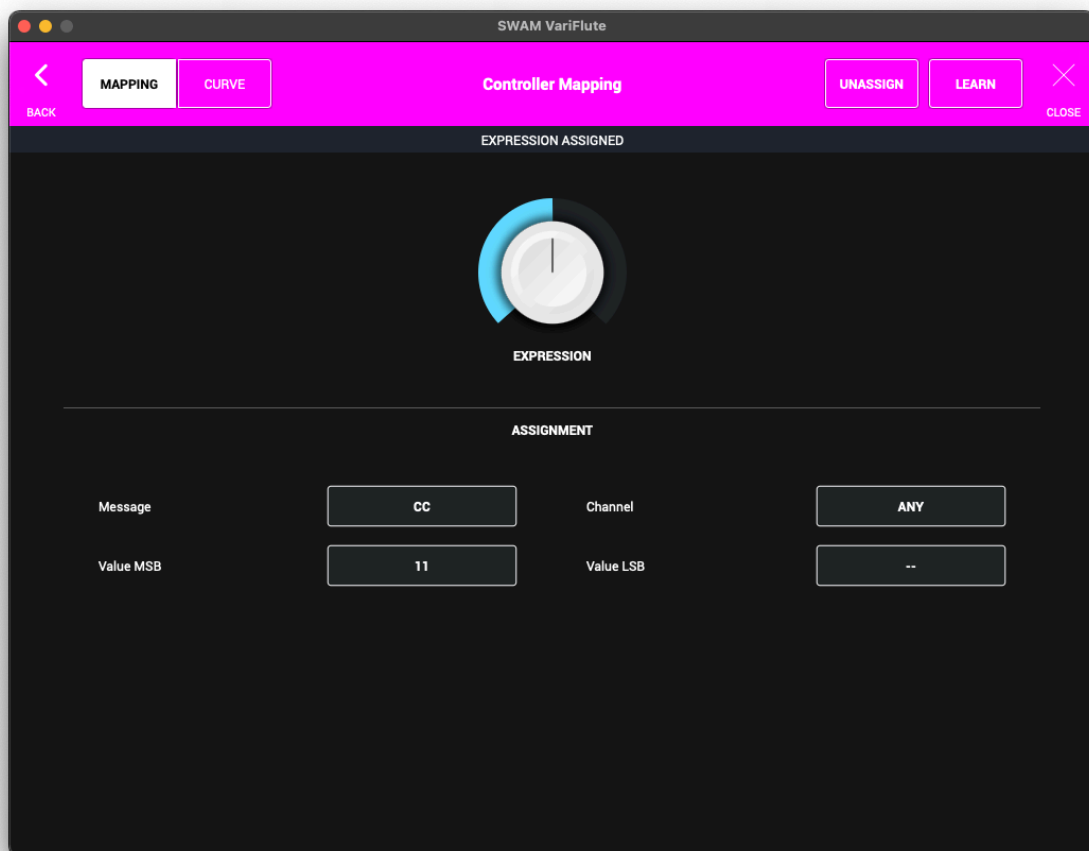
To access this page, click on the MIDI mapping icon in the header , or from the Main Menu -> Controller Mapping -> Assign & Learn. By default, the "ASSIGN" mode is selected.

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 view the list of all parameters, their mapping status and to manage the sound engine parameters that have a direct effect on playability results with different controller types.
- Click on “Templates” for quickly loading MIDI Controller presets and configurations, whether they are Factory presets or user-defined settings.
- Click on the “X” button in the top header to exit from Controller Mapping mode.

Mapping Screen

Assigned parameter status



- Back: goes back to the previous screen
- CURVE: show the MIDI remapping curve for the selected mapping

- UNASSIGN: removes the current mapping and goes back to MIDI Learn mode
- LEARN: turns ON/OFF the MIDI LEARN to edit or remap the current parameter
- X: close the mapping screen and turn off the MIDI Mapping Mode
- Assignment section:
 - Message: MIDI message type:
 - CC: Control Change (1 byte value).
 - CC-HIRES: two coupled Control Change messages, MSB and LSB.
 - AT: Aftertouch (1 byte value).
 - NRPN: Non-Registered Parameter Number.
 - Channel: change which 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 is 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*

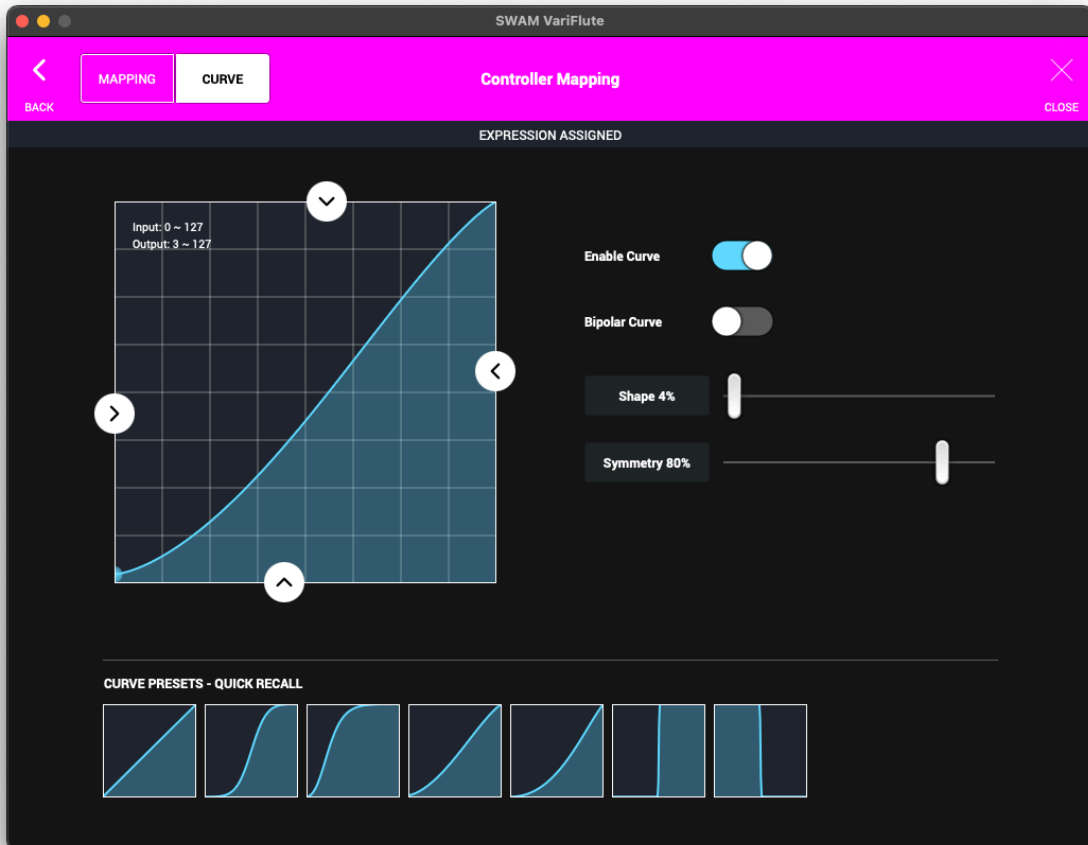
to control some aspects of the sound produced by a synthesizer or software instrument. AT is a standard 7-bit MIDI message, allowing a total of 128 values of resolution.

- 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 represented 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 represented 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>

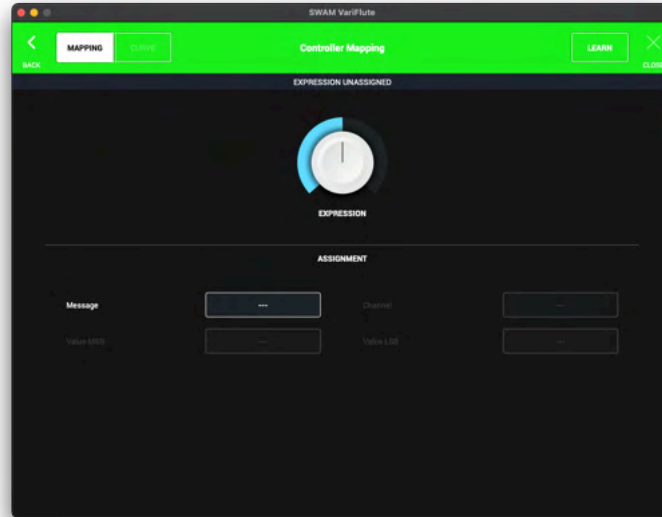
- CURVE: click on the button to show the mapping curve. The curve can be used to adjust the controller-to-parameter behavior with:
 - Input Min (left arrow): the minimum threshold on the controller input value. Values below this value will produce the "Out Min" value (or the "Out Max" value, if the curve 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 parameter of the remapping curve are referred to just one side and the applied to the "negative", antisymmetric side

- 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.



Unassigned parameter status

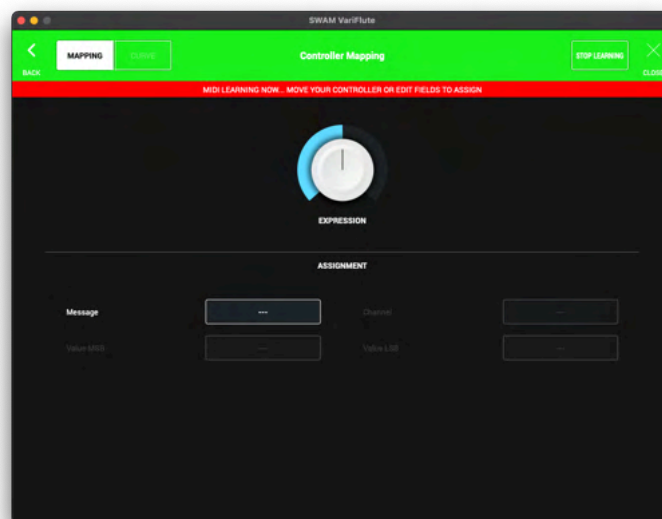
Any click on an unassigned parameter goes to this screen.



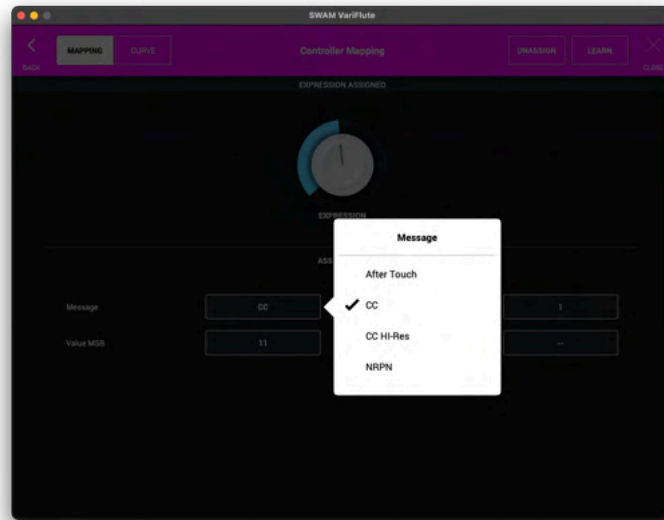
MIDI Learn

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.



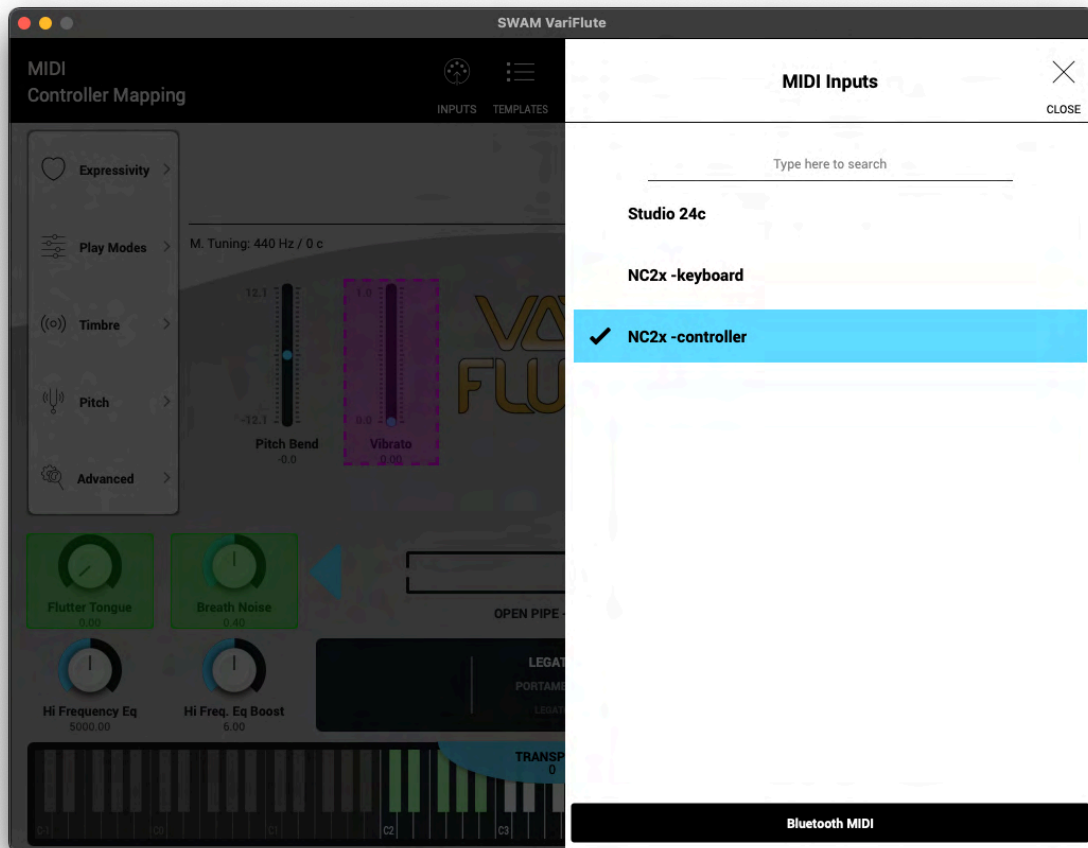
The list of values of the "Message" parameter can be accessed with a long press gesture (click & hold).



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 



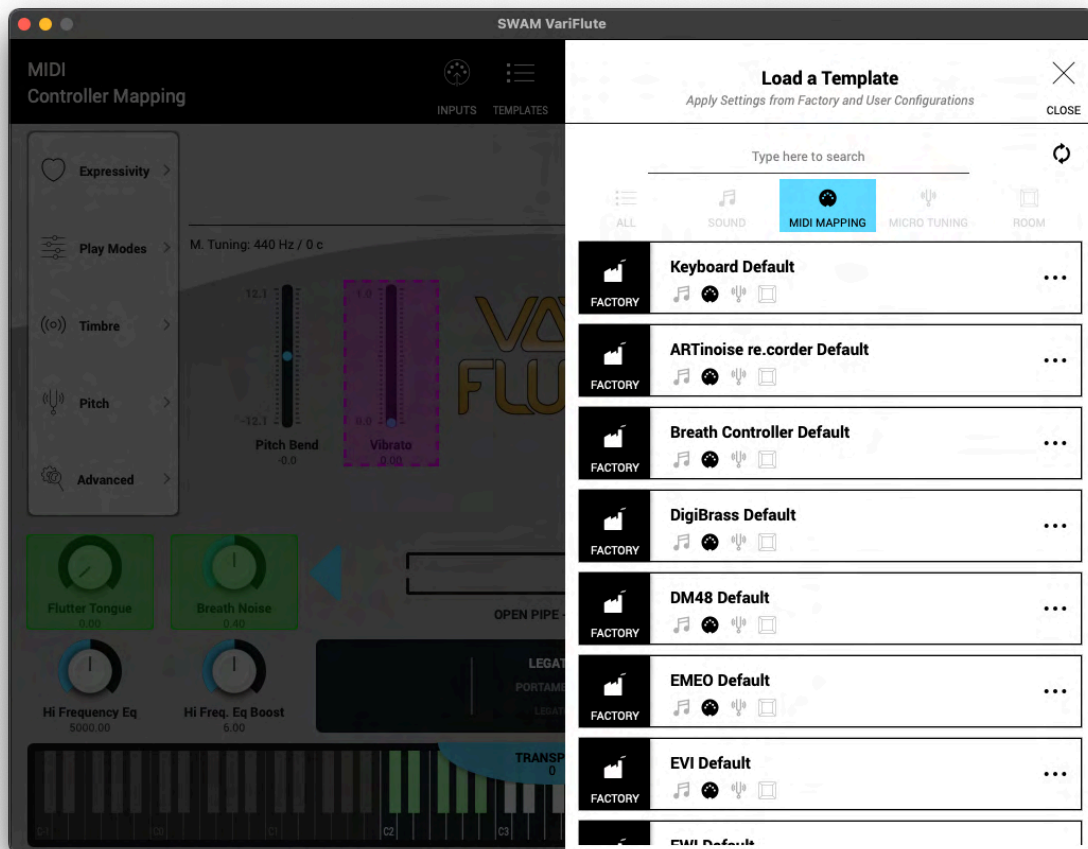
Note: the MIDI Inputs panel shows up automatically at startup, if no MIDI Input has been selected before or if any previous connection has not been found.

MIDI Mapping Templates

It is possible to recall a predefined set of both pre-defined assignments for well known MIDI



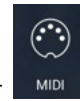
Controllers and User MIDI assignments through the TEMPLATES icon.

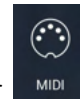


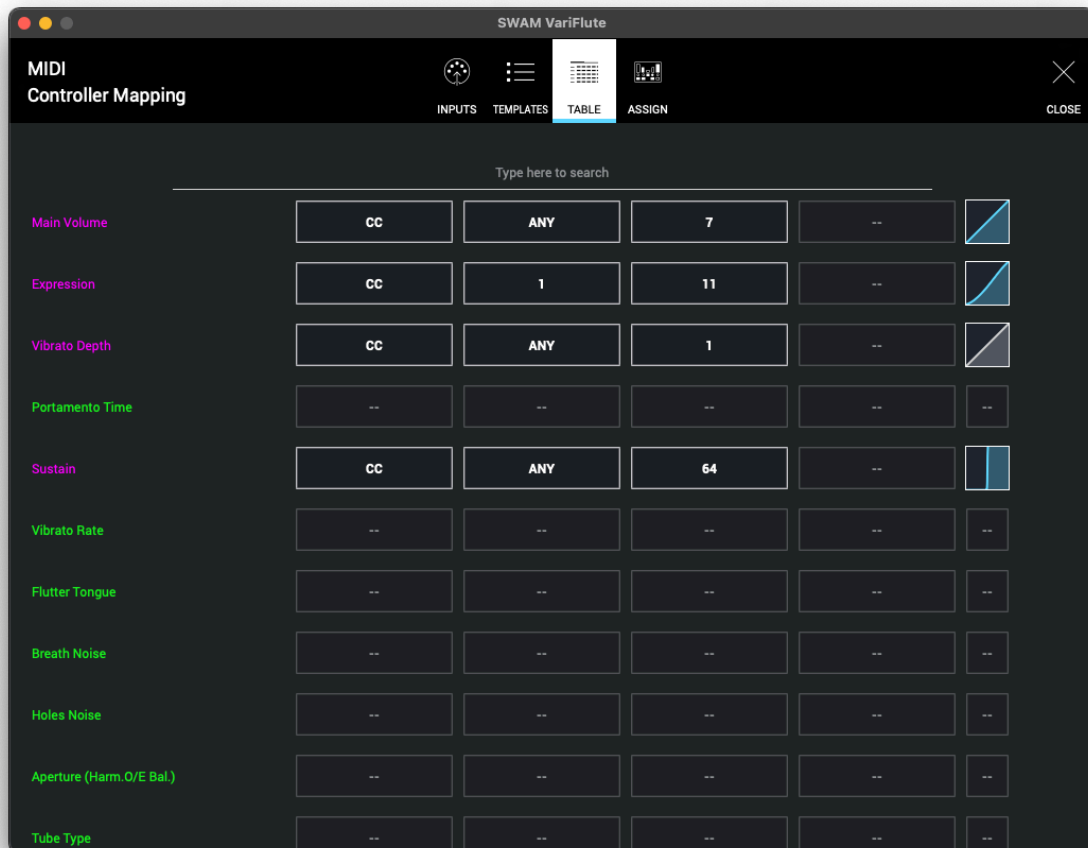
These entries allow us to recall predefined sets of assignments without impacting on the Sound parameters. This is useful when switching between different physical MIDI controllers without losing the timbre and sound behavior obtained acting on the Sound parameters.

A list of Factory Templates for the most known MIDI controllers is provided.

MIDI Mapping Table



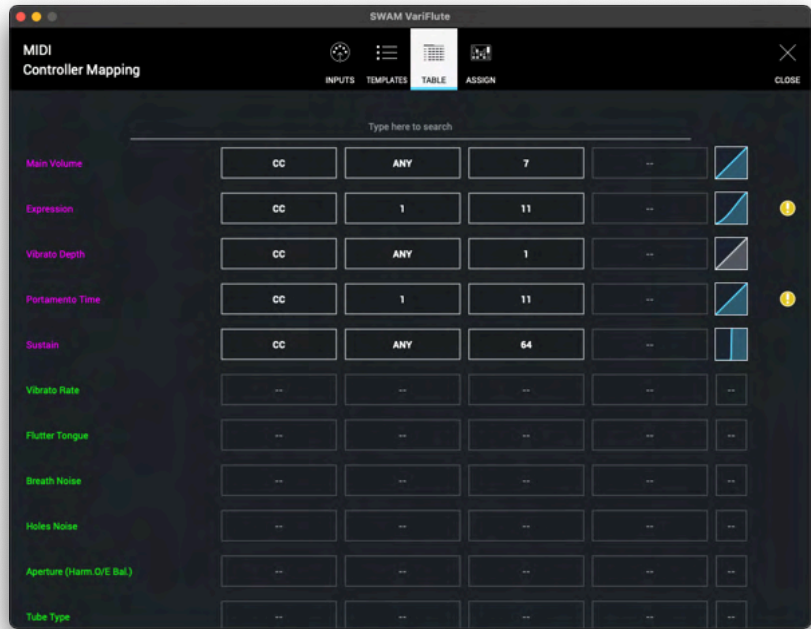
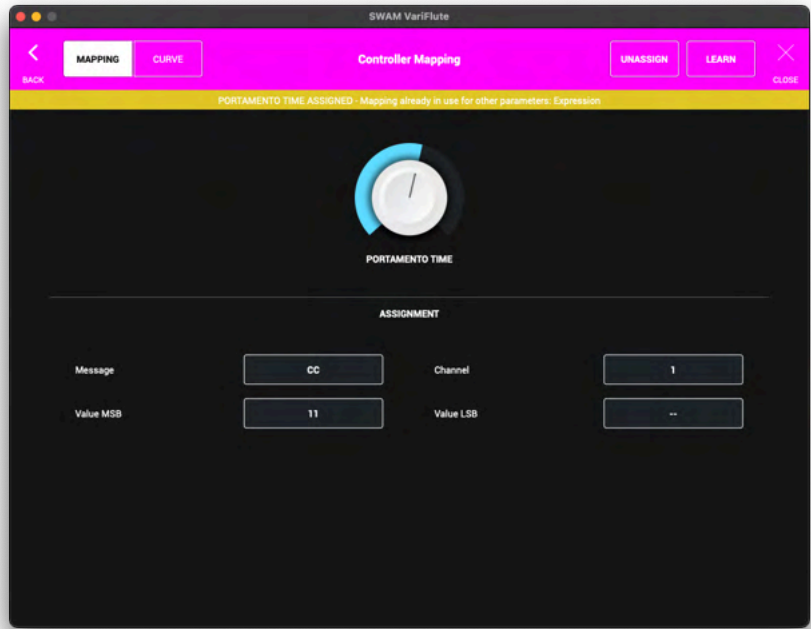
The “MIDI Mapping Table”, found on the MIDI mapping icon in the header , or from the Main Menu -> Controller Mapping -> MIDI Mapping & Quick Reset, recaps all the mapping settings, providing a bigger picture of all mappings.



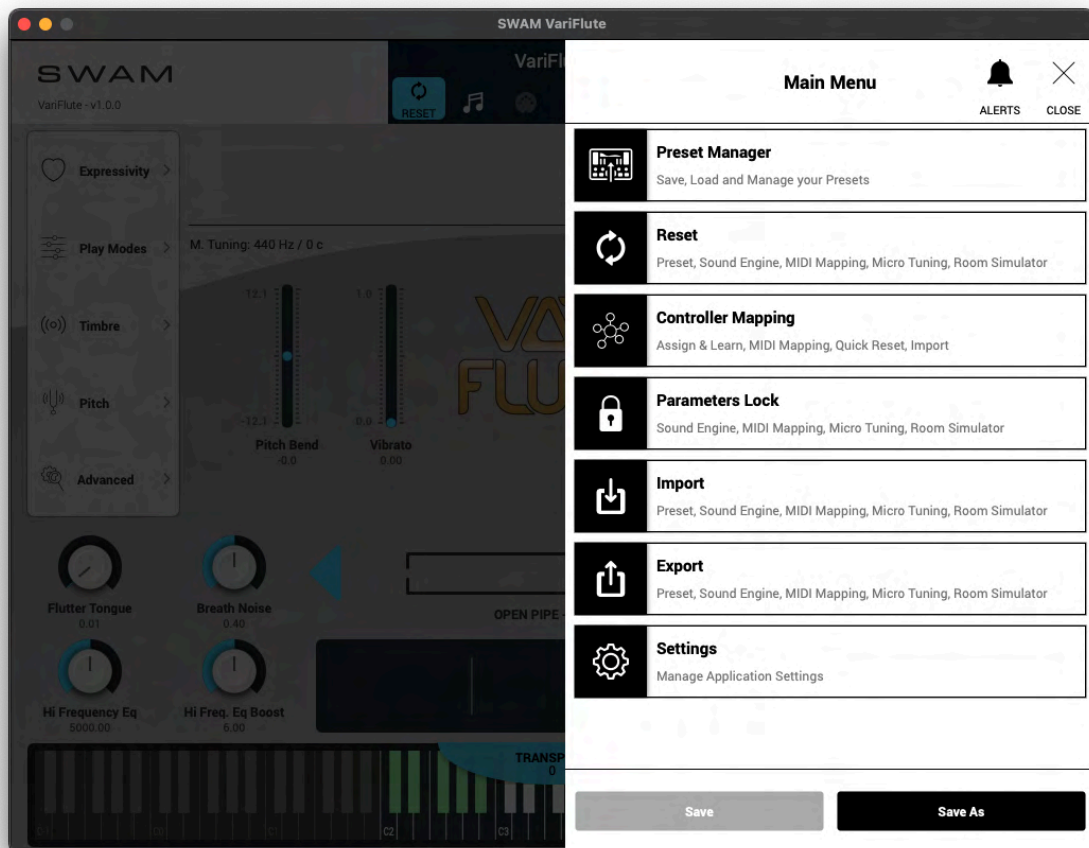
This is the list of all the parameters that can be mapped individually by the process described above. Click on any row to create a new assignment, or to edit an existing assignment.

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 Table 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.

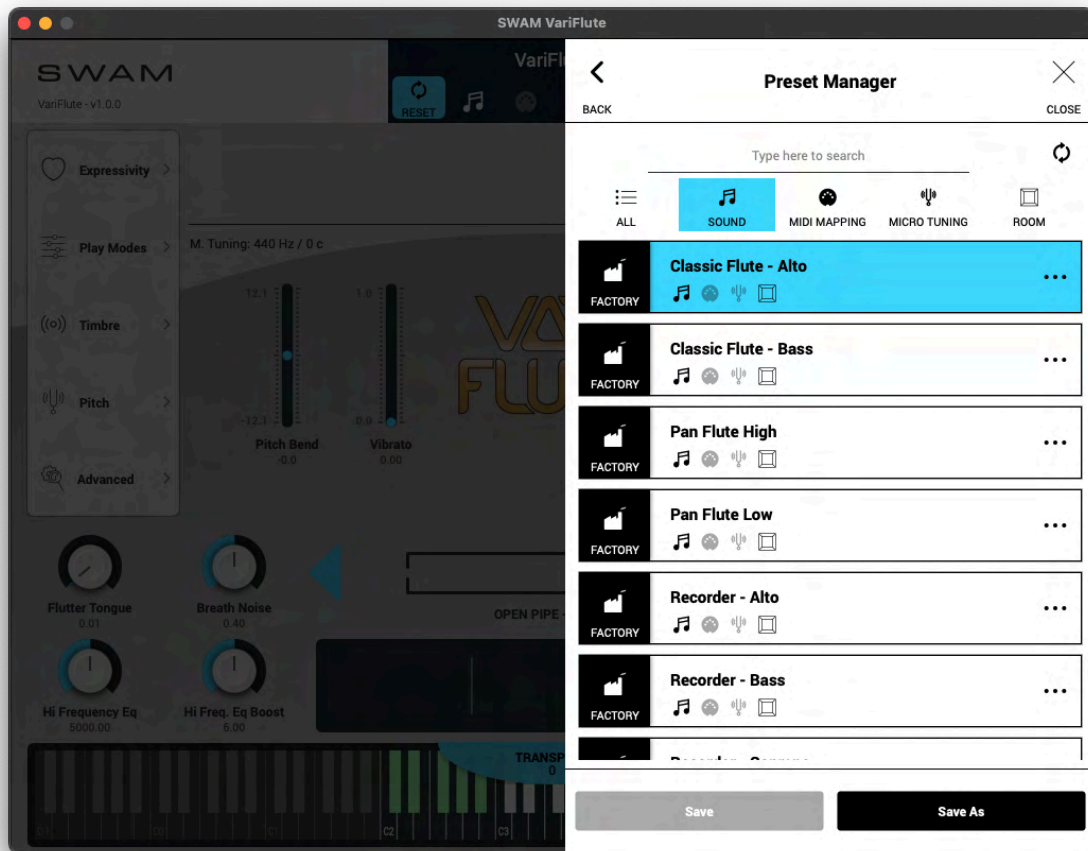
- Preset Manager: open the Preset Management window.
- Reset:
 - Initialize: reset the instrument and return to its initial state; this includes sound engine, MIDI mapping, micro tuning and room
 - Advanced:

- 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
- 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 setting 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 four groups of parameters and settings: Sounds, MIDI Mapping, Micro Tuning, and Room. A preset is a container that can store different types of data, specifically:

- Sounds: Parameters of the sound engine.
- MIDI Mapping: How parameters are mapped through MIDI controllers.
- Micro Tuning: Management of the micro tuning engine.
- Room: Settings of the Ambiente room simulator.

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.

Preset navigation and selection

To open the list of available presets, select the Preset name area in the header of the Main Window, or navigate to Main Menu -> Preset Manager.



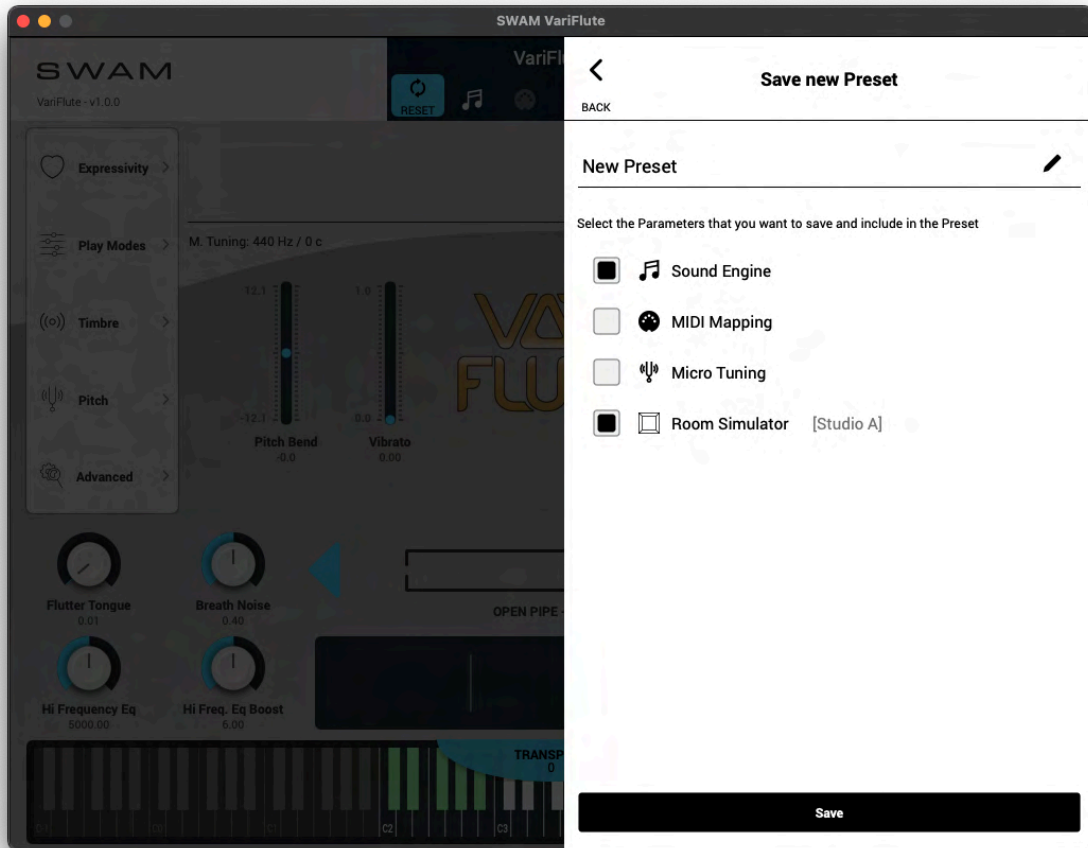
Presets can be searched by typing keywords in the Search area and can also be filtered by type: Sound, MIDI Mapping, Micro Tuning, or Room.

To select a preset, click on the desired item in the list, or use the keyboard accessibility commands if a screen reader is active.

Saving a User Preset

There are two methods to save a User preset:

- **Save As:** This option allows you to create a new User preset based on the current settings of an existing preset, including Factory presets. To use this option:
 - Select the desired preset.
 - Modify the parameters as needed.
 - Click the "Save As" button.
 - Select one or more groups to include in the new preset: Sound, MIDI, Micro Tuning, Room.
 - Enter a name for the new User preset and save it. The new preset will now appear in the list of User presets.
- **Duplicate:** This option creates an exact copy of the selected preset, which can then be modified. To use this option:
 - Select the preset you want to duplicate.
 - Click on the contextual menu (represented by the "..." icon)
 - Click the "Duplicate" button.
 - The duplicated preset will now appear in the list of User presets, you can then rename and edit as needed.



Editing and Exporting Presets

In the preset list, the contextual menu (represented by the "..." icon) provides additional options. Note that the "Edit" and "Export" options are available only for the currently selected preset. Therefore, it is possible to modify and export only the preset that is currently selected.

To edit a preset:

- Select the preset you want to modify.
- Click the "..." icon next to the preset.
- Choose "Edit" from the contextual menu.
- On the next panel you can rename the preset as well as select the parameter groups you want to store and include in the current preset (sound engine, midi mapping, micro tuning and room simulator).



To export a preset:

- Select the preset you want to export.
- Click the "... " icon next to the preset.
- Choose "Export" from the contextual menu.

We also provide "templates" that allow you to reset a subset of parameters without losing your global state. For example, you can switch from the default Seaboard mapping to the default Wind controller mapping without losing your sound configuration.

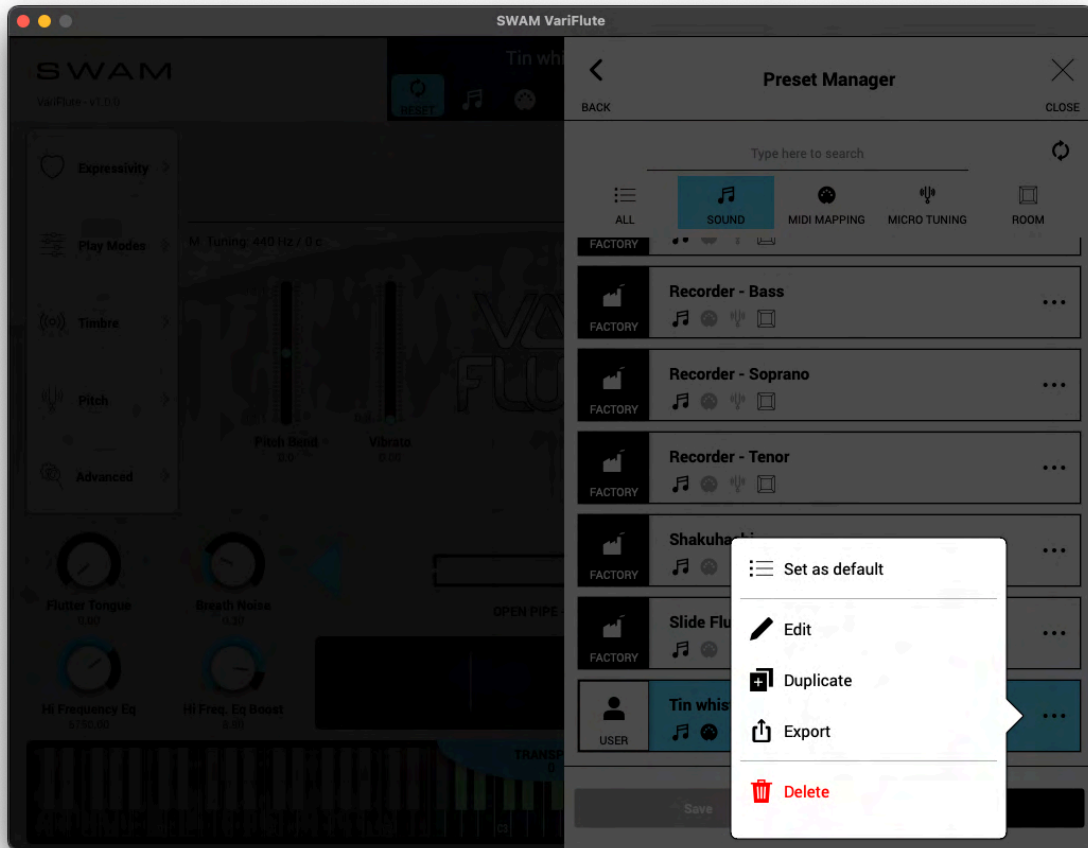
Presets can be recalled either in their entirety or partially. Partial recall is done through templates, which allow loading data from the MIDI Mapping, Micro Tuning, and Room groups without affecting the sound settings. Templates are also contextually available in their respective areas of interest.

Default startup Preset and other options

Any preset can be selected to become the "default" one, i.e., the one loaded at startup. To do this, click on the "... " contextual menu next to the preset name and choose "Set as default."

In addition to setting a preset as default, the contextual menu provides several other options:

- **Edit:** Modify the currently selected preset.
- **Export:** Export the currently selected preset.
- **Delete:** Remove a User preset if necessary. Note that this option is only available for User presets and not for Factory presets.



To summarize, the contextual menu allows you to:

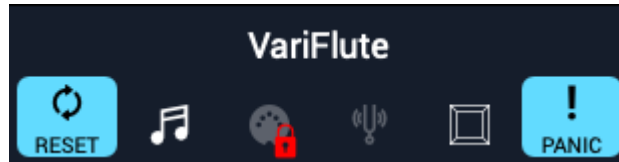
- Set a preset as the default.
- Edit the currently selected preset.
- Export the currently selected preset.
- Delete a User preset.

These options make it easy to manage your presets efficiently, ensuring you have quick access to your preferred settings and the ability to customize and organize your presets as needed.

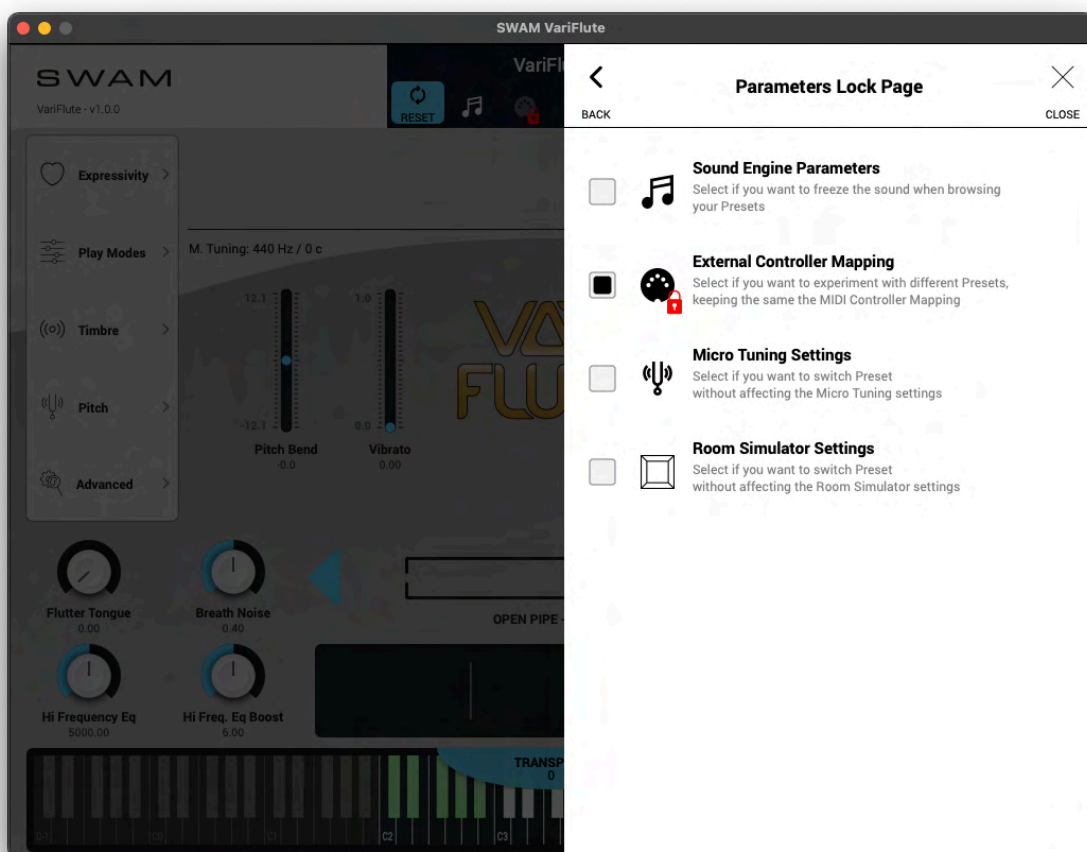
Parameter Lock

The “Parameter Lock” feature allows you to switch presets without affecting the category of parameters that is locked.

The Parameters Lock function is available with a long press on the Preset name area,



or from Main Menu -> Parameters Lock.

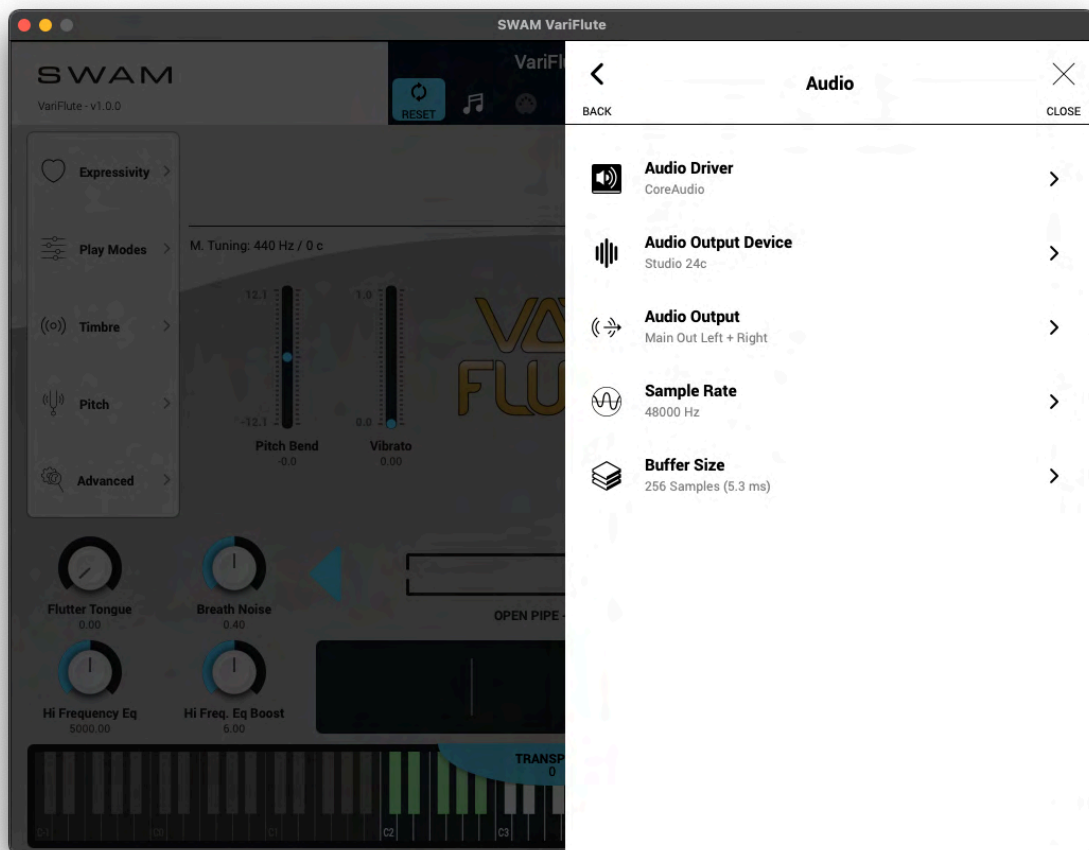


- Select “Sound Engine Parameters” if you want to freeze the sound when browsing your presets.
- Select “External Controller Mapping” if you want to experiment with different presets, keeping the same MIDI controller mapping. Useful if you want to change sound but keep playing with your MIDI controller.

- 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

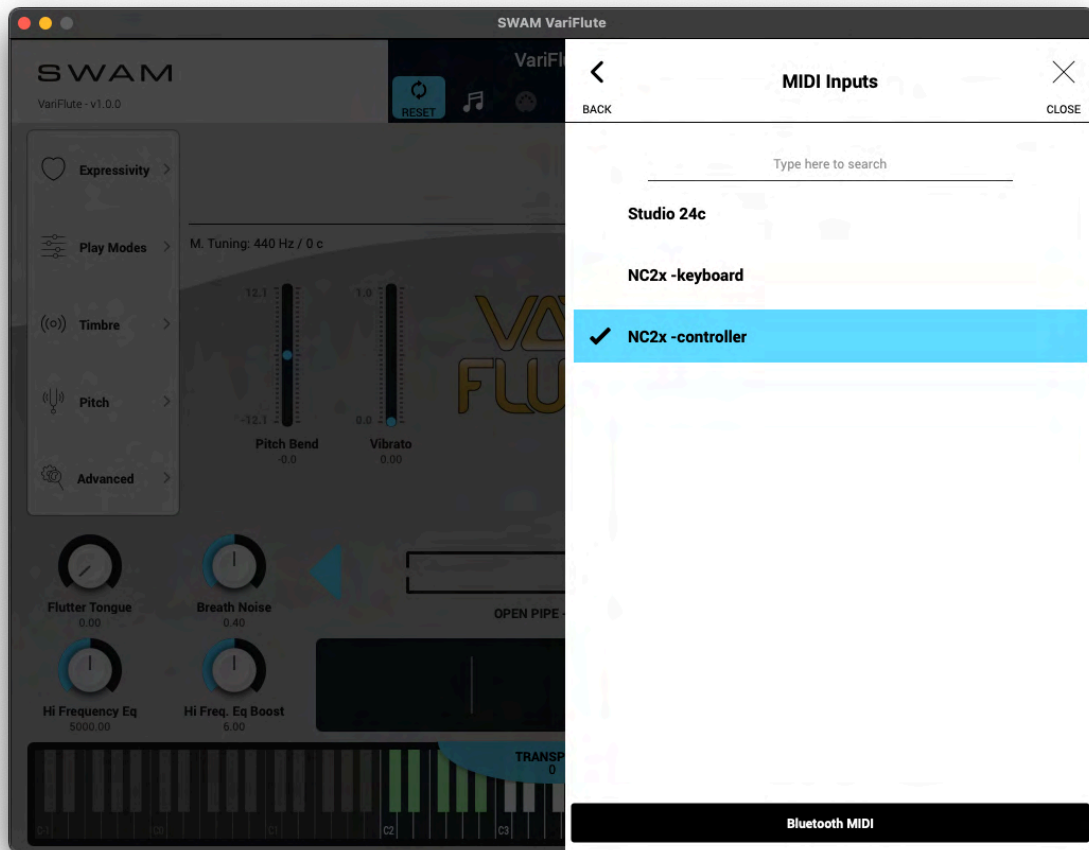
Audio Settings



The Audio Settings page is available for Standalone version only, and allows you 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

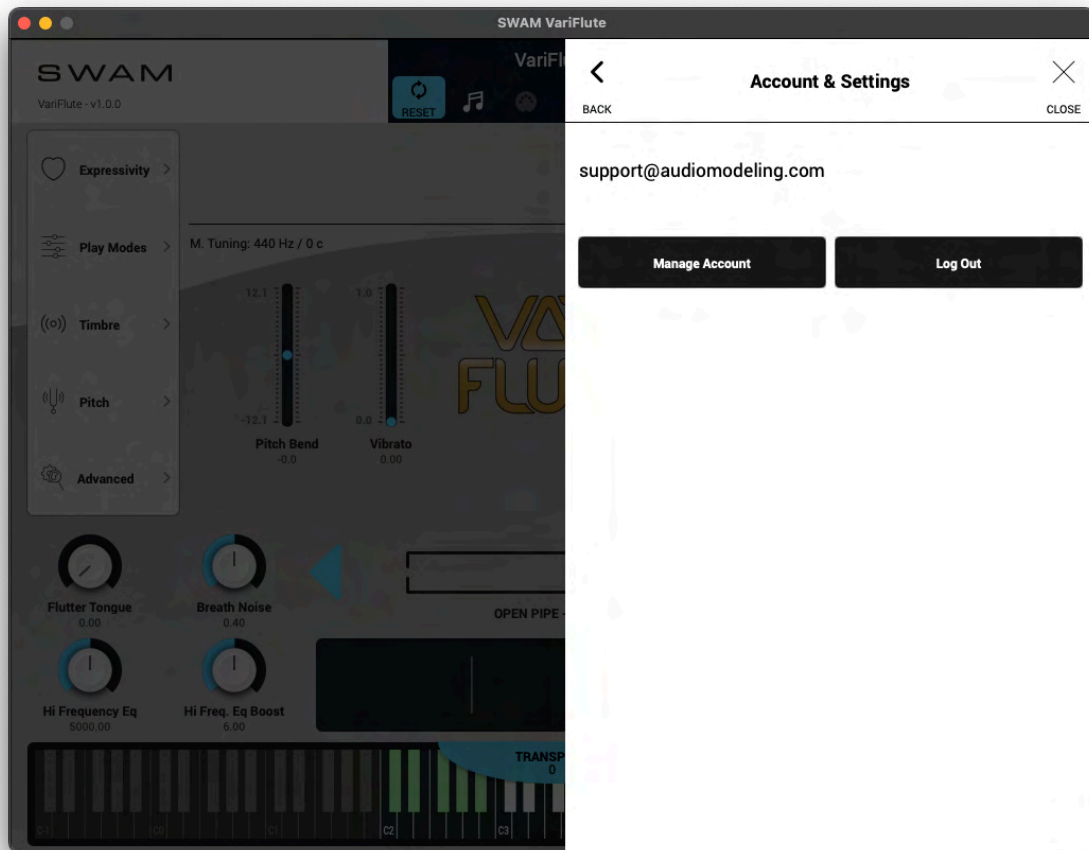


The MIDI Settings page is available for Standalone version only and allows you to select one or more MIDI devices to control the instrument.

It's also possible to use a Bluetooth MIDI device by selecting "Bluetooth MIDI".

Once you have correctly selected your MIDI controller(s), be sure that suitable [MIDI mapping](#) has been configured, eventually through [MIDI Templates](#).

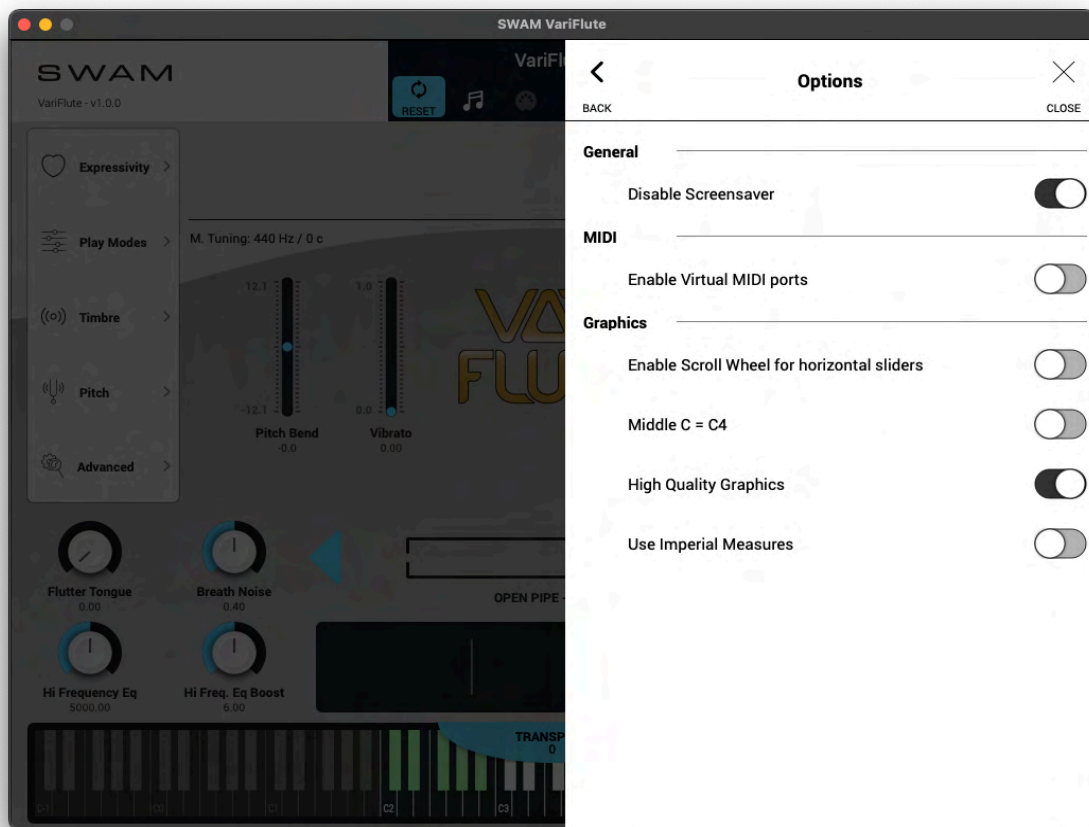
Account & License



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

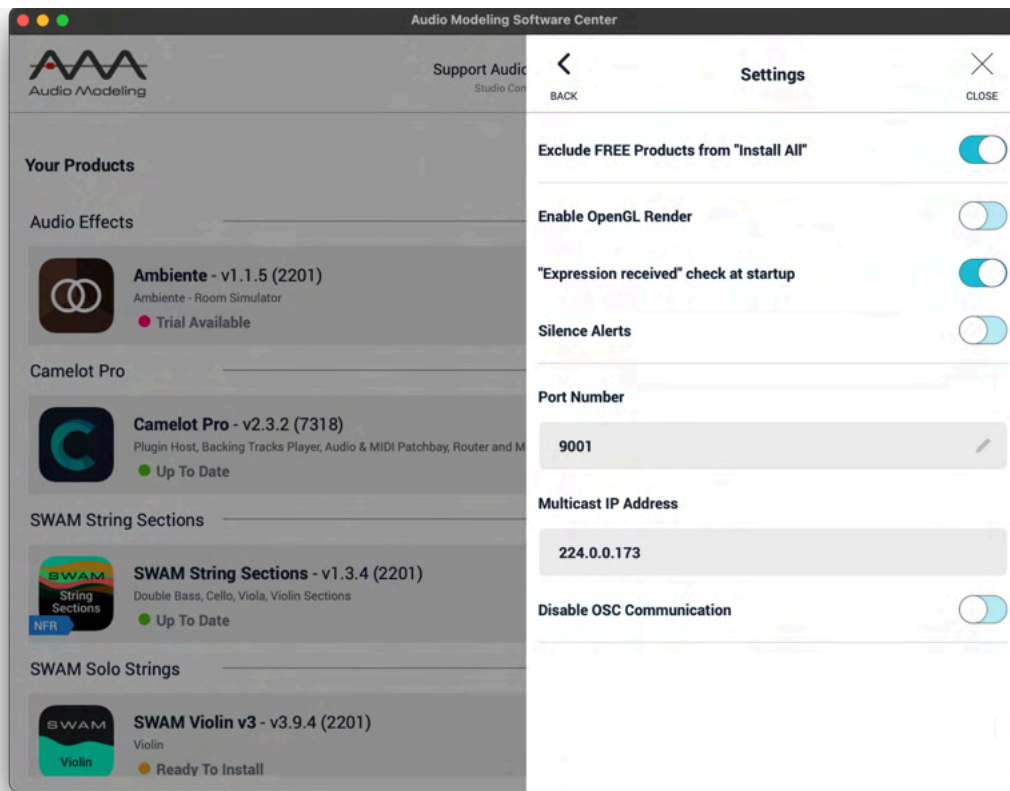
Options



- 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
- High Quality Graphics: quality level of User Interface details, like shadows and gradients. Turn off for lower CPU usage
- Use Imperial Measures: switches the interface to imperial units

Global Settings

Common / global settings for all products are managed from the Audio Modeling Software Center application. Click on the “...” menu and select the “Settings” 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
- Silence Alerts: silences all alerts in SWAM instances
- Port Number: (OSC Settings) used for the intercommunication of SWAM 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 instances via Open Sound Control (OSC) exclusively on 224.0.0.173 IP address.



Local Network Permission

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

macOS

Method 1: Allow Local Network Access for Applications

When an app attempts to access the local network for the first time, macOS prompts a message such as:

"[AppName] would like to find and connect to devices on your local network."

If you denied access or want to verify permissions, follow these steps:

macOS 15 (Sequoia) & onward

1. Open System Settings.
2. Go to Privacy & Security.
3. Scroll down to Local Network.
4. Find the app that needs local network access and toggle it on.

macOS 14 (Sonoma)

1. Open System Settings.
2. Navigate to Network.
3. Open Firewall.
4. If the Firewall is turned on, open Option and Ensure the app is authorized to connect to the local network.

Reference:

[Control access to your local network on Mac](#)

Method 2: Configure the Firewall to Allow Incoming Connections

If the firewall is active, it may block some local network connections. You need to configure it to allow traffic for the required applications.

macOS 15 & 14 (Sequoia & Sonoma)

1. Open System Settings.
2. Go to Network.
3. Select Firewall.
4. Click Options if the firewall is turned on.
5. Ensure the application is listed and allowed to accept incoming connections.

macOS 13 & 12 (Ventura & Monterey)



1. Open System Preferences.
2. Go to Security & Privacy.
3. Click the Firewall tab.
4. If the firewall is enabled, click Firewall Options.
5. Verify that the application is listed as allowed.
6. If it is not listed, click +, select the app, and choose Allow incoming connections.

Reference:

[Change Firewall settings on Mac](#)

Method 3: Verify VPN Settings for Local Communication

Certain Wi-Fi networks or VPNs may block local traffic.

- If using a VPN, try temporarily disabling it to ensure it is not blocking local traffic.

Reference:

[About privacy and Location Services in macOS](#)

After completing these steps, your application can:

- Scan the local network for devices.
- Communicate with other devices on the network.
- Avoid being blocked by firewalls or security settings.

Windows

Method 1: Allow Applications Through Windows Defender Firewall

Windows Defender Firewall may block applications from accessing the local network. To permit an app through the firewall:

- Open Windows Security:
 - Click on the Start menu.
 - Type Windows Security and press Enter.
- Navigate to Firewall & Network Protection:
 - In the Windows Security window, select Firewall & network protection.
- Access Allowed Apps:
 - Scroll down and click on Allow an app through the firewall.
- Modify Settings:

- Click on the Change settings button.
- If prompted by User Account Control (UAC), click Yes to grant permissions.
- **Locate and Enable the Application:**
 - In the list of applications, find the app you want to allow.
 - Check the box next to the application's name.
 - Ensure the appropriate network types (Private and/or Public) are selected.
- **Add Missing Applications:**
 - If the app isn't listed:
 - Click on Allow another app....
 - Use the Browse button to locate the application's executable file.
 - Click Add, then ensure it's selected in the list.
- **Save Changes:**
 - Click OK to apply the settings.

Method 2: Configure Network Discovery and File Sharing Settings

To ensure your applications can communicate over the local network, enable Network Discovery and File Sharing:

- **Open Settings:**
 - Press Win + I to open the Settings app.
- **Navigate to Network & Internet:**
 - Click on Network & Internet in the left-hand menu.
- **Access Advanced Network Settings:**
 - Scroll down and select Advanced network settings.
- **Change Advanced Sharing Settings:**
 - Under More settings, click on Advanced sharing settings.
- **Enable Network Discovery and File Sharing:**
 - Expand the Private network profile.
 - Toggle on Network discovery and check Turn on automatic setup of network connected devices.
 - Toggle on File and printer sharing.



- Save Changes:
 - Click Save changes to apply the settings.

By following these methods, your applications should now be able to:

- Discover other devices on the local network.
- Communicate without being blocked by Windows Defender Firewall.
- Operate with the necessary permissions for local network access.

For more detailed information, you can refer to the official Microsoft documentation on [Allowing apps to communicate through Windows Defender Firewall](#).

iOS

Method 1: Grant Local Network Access to Applications

When an app first attempts to access the local network, iOS displays a prompt:

"[AppName] would like to find and connect to devices on your local network. This app will be able to discover and communicate with devices on the networks you use."

If access was denied or if you need to verify permissions, follow these steps:

1. Open Settings.
2. Scroll down and find the app that requires local network access.
3. Tap on the app.
4. Ensure that Local Network is toggled ON.

Alternative way to check all apps at once (iOS 16 & onwards):

1. Open Settings.
2. Go to Privacy & Security.
3. Tap Local Network.
4. You will see a list of all apps that have requested local network access.
5. Ensure the required apps are enabled.

Reference:

- [If an app would like to connect to devices on your local network](#)

Method 2: Check Wi-Fi Network Settings

Some Wi-Fi configurations may prevent local network communication.

1. Open Settings.
2. Tap Wi-Fi.



3. Find the connected network and tap the (i) button next to it.
4. Check if Private Wi-Fi Address is enabled. If local communication issues persist, try disabling this setting temporarily.
5. Ensure Limit IP Address Tracking is OFF, as it may interfere with local discovery.

Reference:

- [About privacy and Location Services in iOS, iPadOS, and watchOS](#)

Method 3: Check Firewall, VPN, or Proxy Settings

VPNs, firewalls, or proxy configurations can block local network traffic.

1. Open Settings.
2. Go to General > VPN & Device Management.
3. If a VPN is active, try temporarily disabling it to see if local network communication improves.
4. If a Proxy is enabled:
 - Go to Wi-Fi.
 - Tap (i) next to the connected network.
 - Scroll down to HTTP Proxy and check if it's set to Manual or Auto.
 - If enabled, try setting it to Off temporarily.

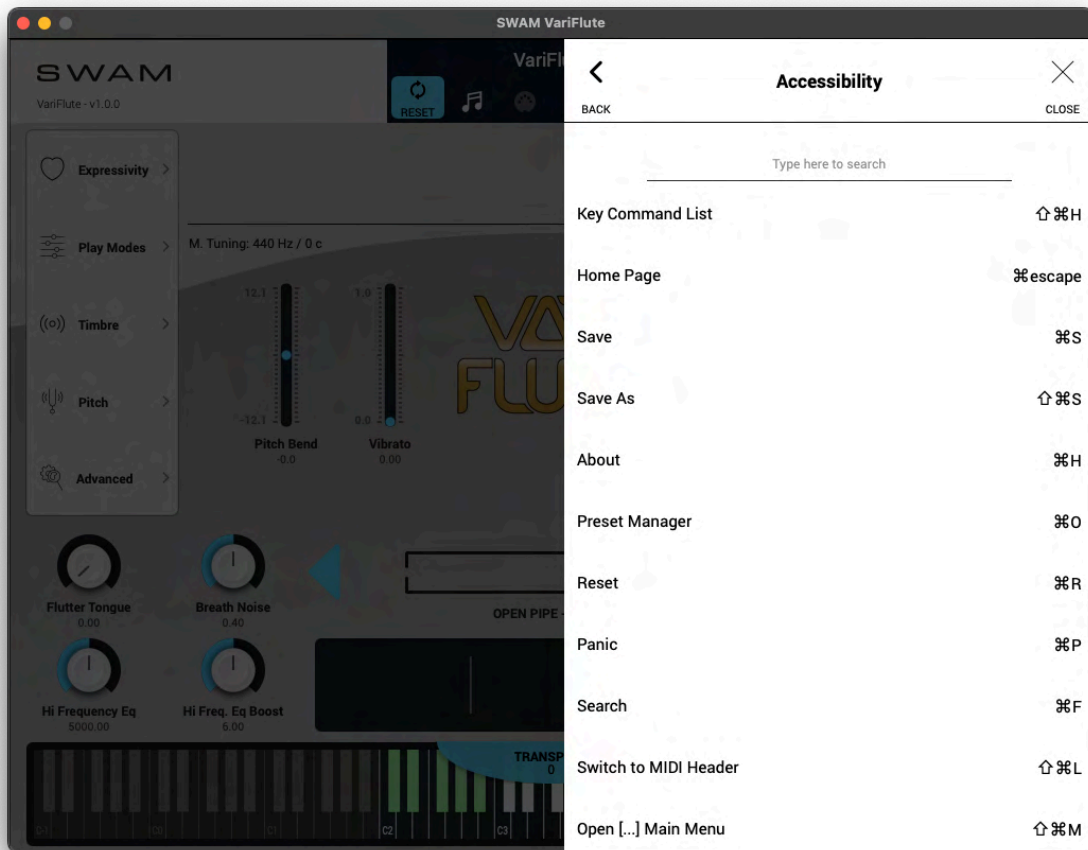
Reference:

- [View and edit your Access Point Name \(APN\) on your iPhone and iPad](#)

After following these steps, your application can:

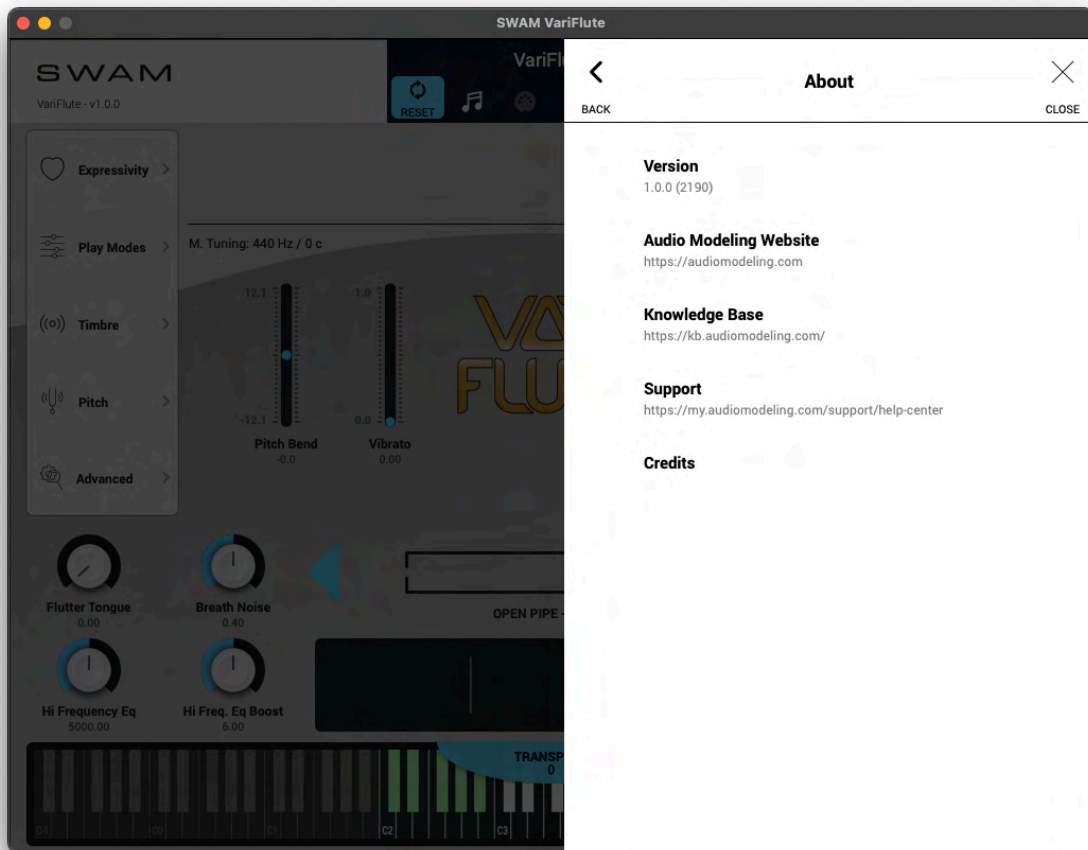
- Discover other devices on the local network.
- Communicate without being blocked by iOS privacy settings.
- Work properly even when running in the background.

Accessibility



Keyboard shortcuts are not only a powerful tool for expert users but also an essential aid for blind or visually impaired users, providing direct access to functionalities. We have carefully designed these shortcuts to be intuitive and easy to remember, ensuring that all users can navigate and utilize our software efficiently. You can find and review all the available keyboard shortcuts in the Accessibility page.

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.



iOS

SWAM apps for iOS are available for iPad and iPhone. Both of those versions share the same engine and GUI elements as the desktop versions, with a few exceptions to adapt the user experience to the specifics of the devices.

- A few advanced parameters are unavailable (locked) on iPad and iPhone. However, desktop presets that include changes to these parameters can be imported to iOS without problem.
- iPad and iPhone offer on-screen, touch-based playing surfaces.
- iPhone has a different layout, but is consistent with the desktop and iPad versions: the same graphical elements and controls are reorganized to maximize the experience on a smaller screen.

List of locked parameters on iOS version


Currently, the following parameters are “locked” on both iPad and iPhone versions:

- TODO

Unlocking through In-App Purchase will be provided in future.

iPad

The GUI on the iPadOS version is identical to that of the desktop version. In addition, you

will find a “PLAY” icon  that accesses a dedicated, on-screen, touch playing surface.

On-Screen Playing Surface



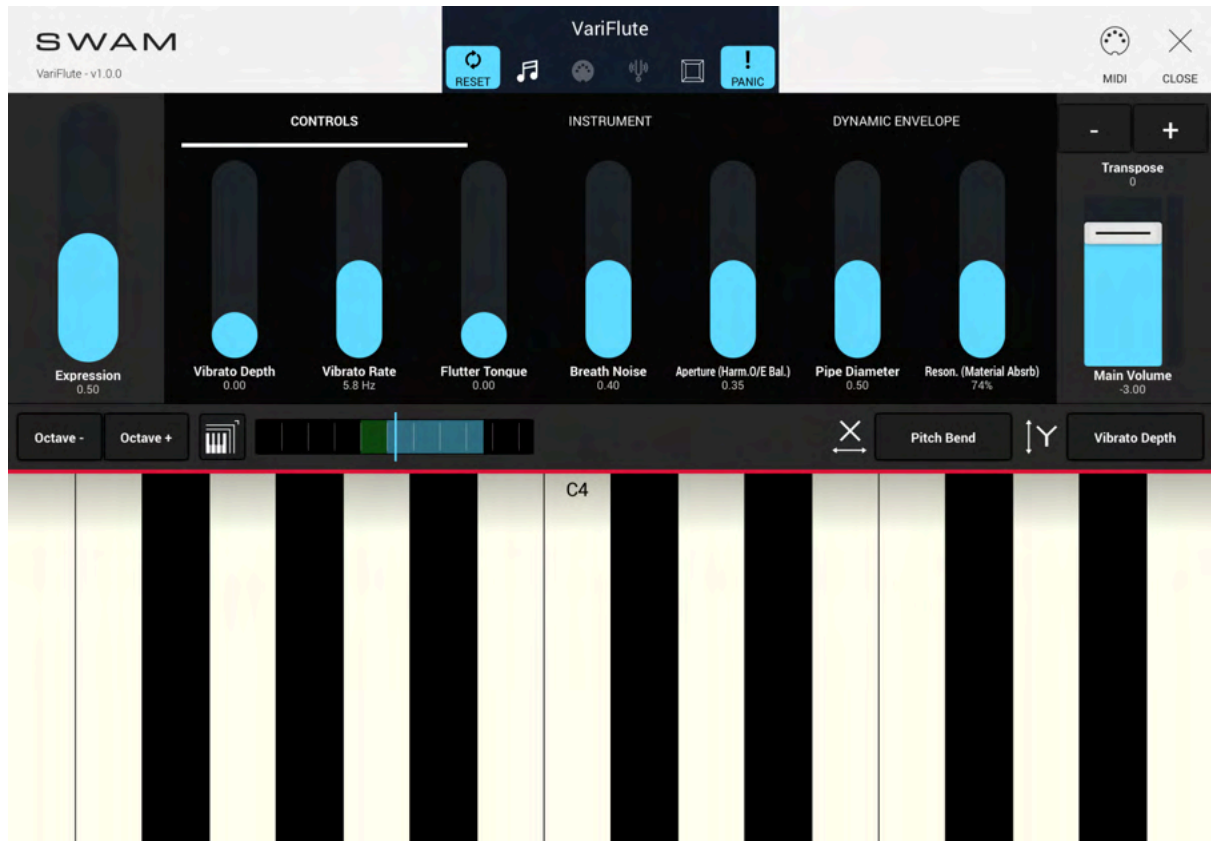
The on-screen playing surface has the following purposes:

- Provide an onboard screen keyboard to perform at basic level without using any external controller
- Provide a visual feedback representation of the sound evolution (Dynamic Envelope)
- Provide direct controls of the most useful performance parameters (Expression, mute selection, control faders).

NOTE: To record and playback on a DAW what has been played on the On-screen playing surface, the “SWAM On-Screen Keyboard” MIDI Mapping Templates must be selected. (see the [MIDI Mapping Templates](#) section).

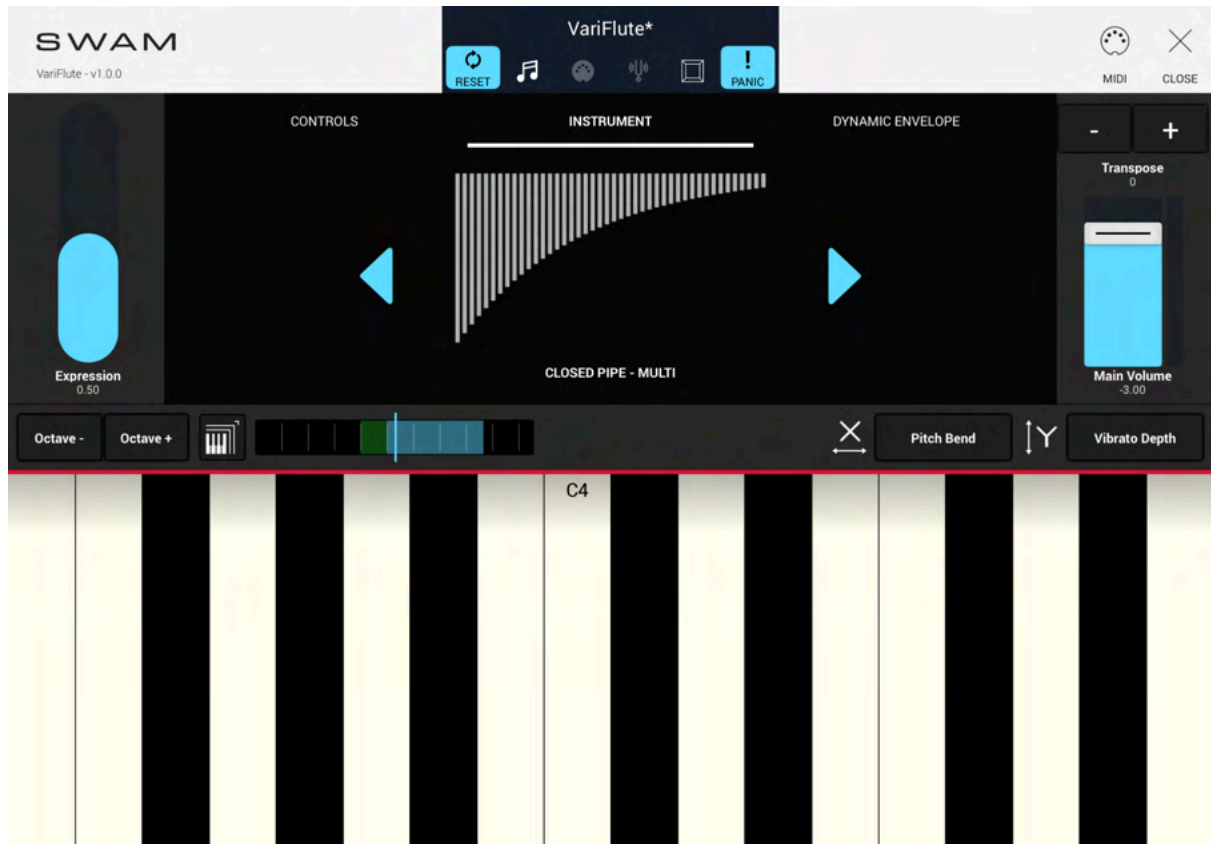
The dynamic areas can be selected just by tapping on the tab name: Control, Instrument, Dynamic Envelope.

Controls



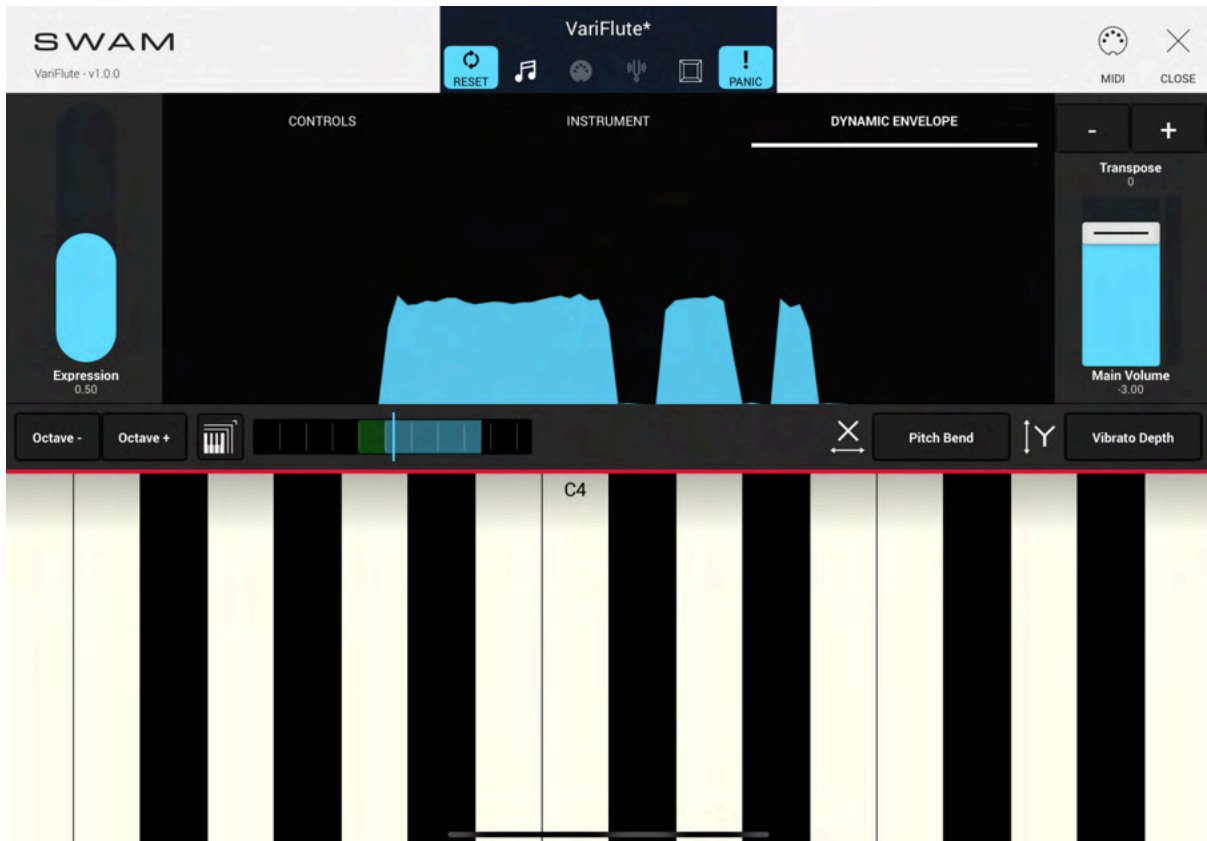
This view provides faders and buttons that are very handy in live performance for tweaking the sound in real time, or adding subtle expressive details, when needed. Play and tweak in real time using the onboard keyboard, or use them as an extra control surface when playing with an external controller.

Instrument



This view shows the instrument selector. Use the arrows to select different instrument timbres.

Dynamic Envelope



This view shows how the sound evolves in real time. The more you change the Expression setting and other parameters, the more interestingly and expressively a SWAM instrument plays. Adjust the Expression setting to create nuance in the sound; use the Dynamic Envelope for visual feedback.

On-Screen Keyboard Setup

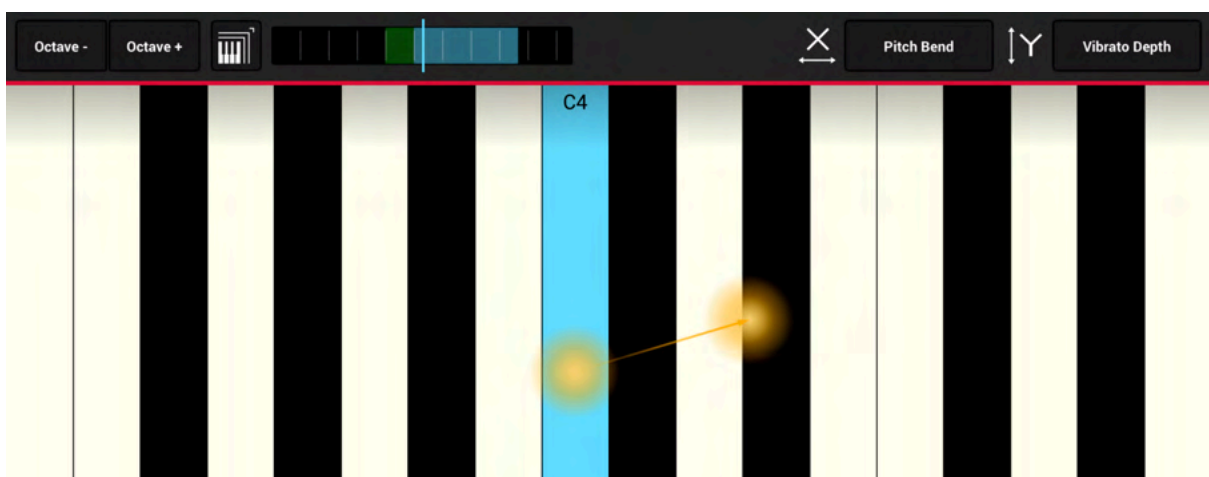
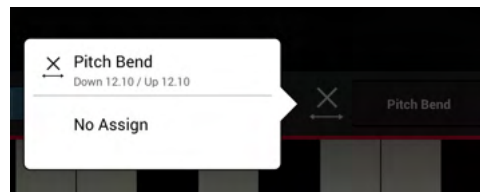


The keyboard has a toolbar with dedicated controls to:

- Shift the pitch by octave (Octave - and Octave + buttons)
- Manage the keyboard size: Select a smaller size to fit more keys on the screen/
 - Small (show 1 octave/13 keys)
 - Medium (show 1.5 octaves/18 keys)
 - Large (show 2 octaves/25 keys)
- Scroll the keyboard: Drag the ribbon to adjust the starting point of the keyboard.
- X and Y axis (direction) assignment: Configure modulation behavior for finger movement along the horizontal and vertical axes.

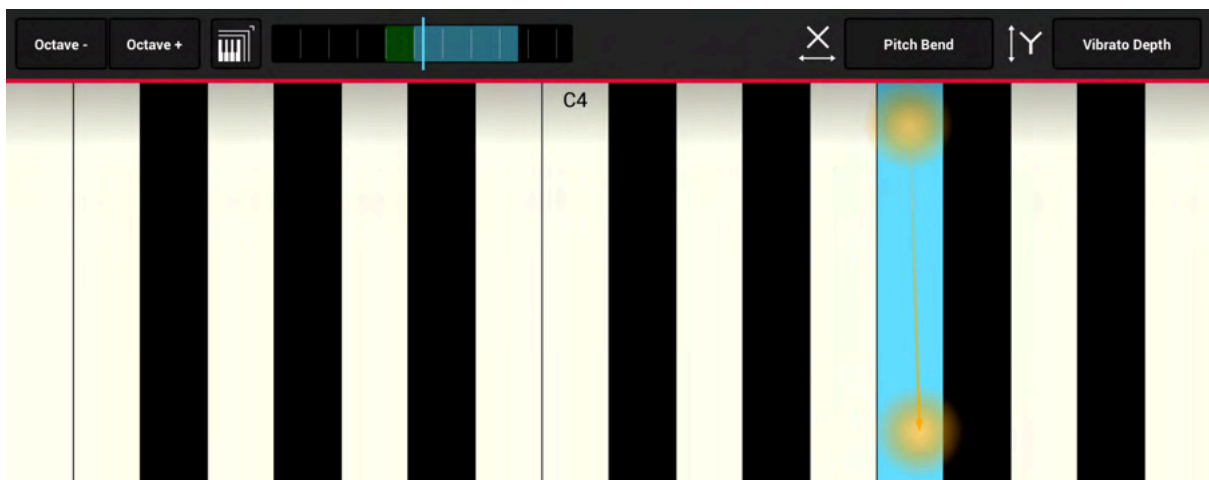
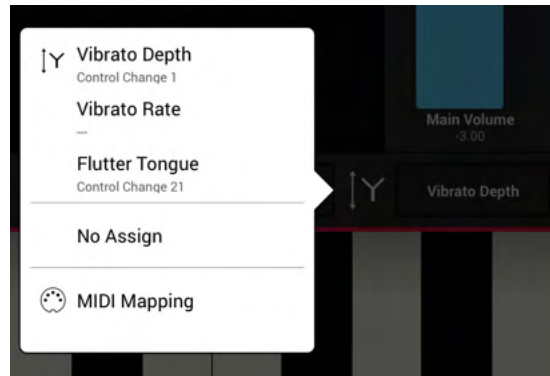
X: Pitch Bend Control Along the X Axis.

Tap on the “X” to show pitch bend range or un-assign pitch bend control.



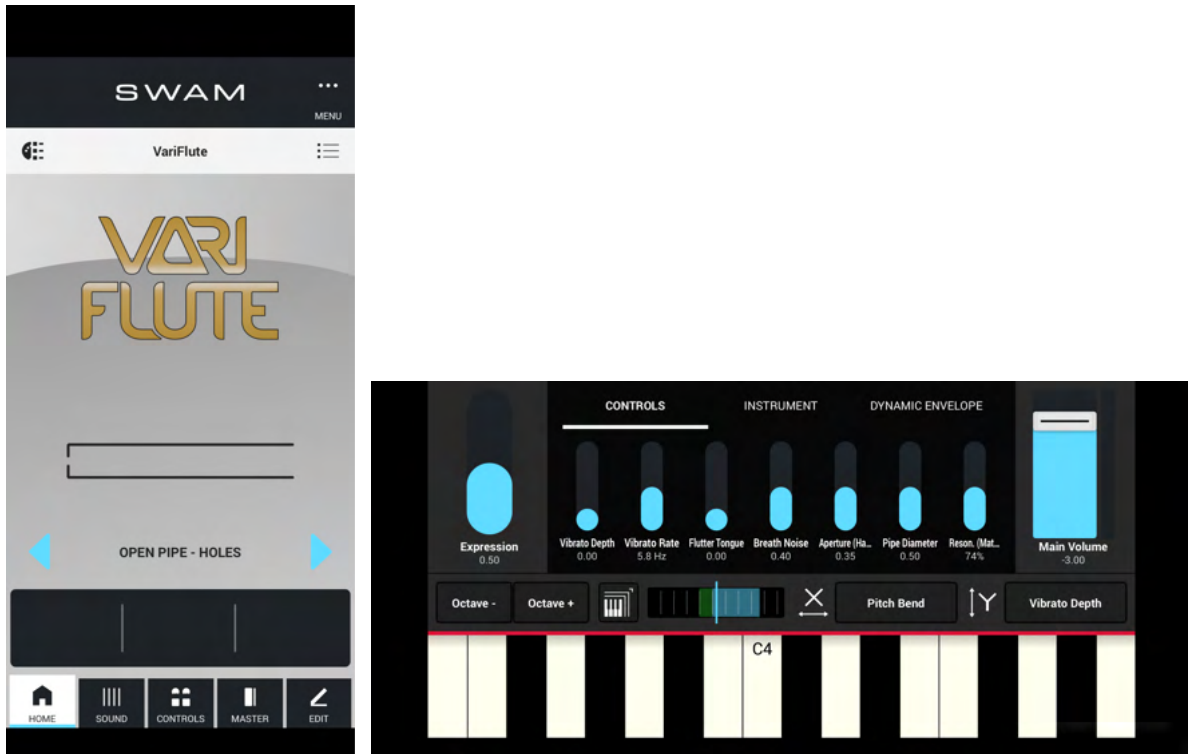
Y: Parameter Control Along the Y Axis

Tap on the “Y” to change the parameter assignment for a Y-axis gesture (by default assigned to Vibrato Depth), and to check what MIDI control is mapped to the parameter. A shortcut to the MIDI Mapping page is provided to make it easy to change the MIDI mapping for the controlled parameter. This is useful when using the control surface for recording MIDI on a DAW, or controlling an external instrument.



iPhone

Keep the iPhone in portrait orientation for editing any parameter or configuration, rotate to landscape orientation to play the instrument using the on-screen surface.

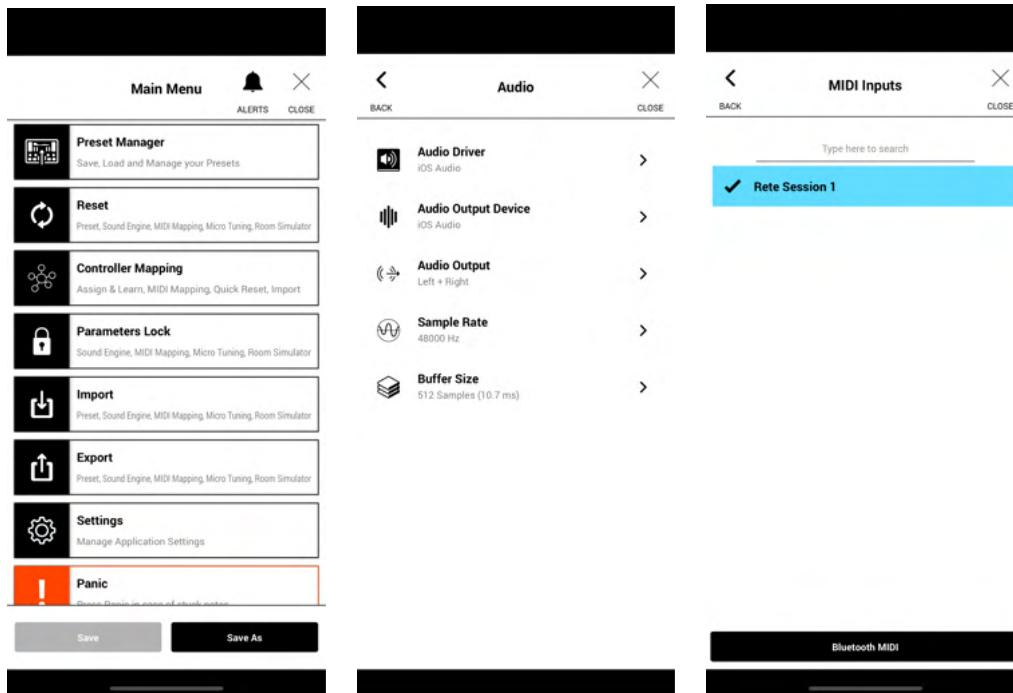



Getting Started


To get started, be sure to check the Audio and MIDI settings, especially if you are using an external audio device or external MIDI controller.

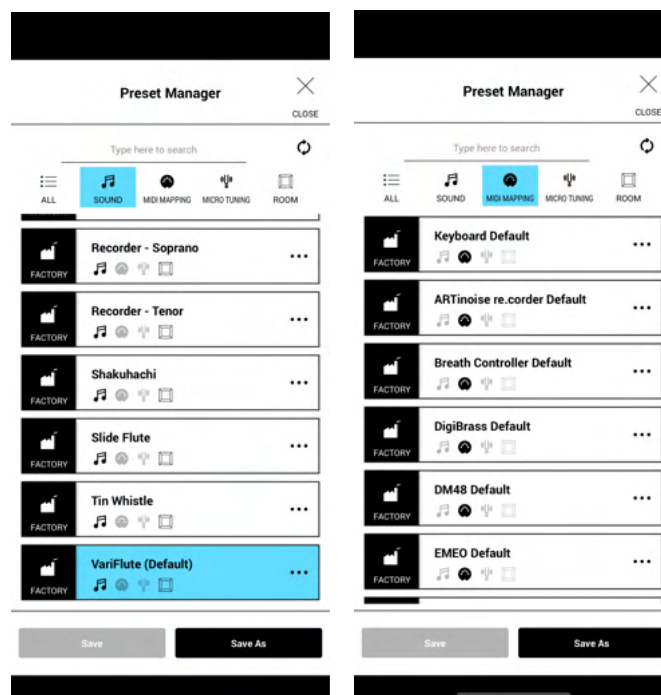
Audio settings are under MENU -> Settings -> Audio. Check that the Active Output Channels, Sample Rate and Buffer Size are correctly selected.

MIDI settings are under MENU -> Settings -> MIDI. Select the MIDI port corresponding to the MIDI controller you are using to play the instrument.



Select the MIDI mapping preset that best matches your MIDI controller. This is done from the MIDI Preset List icon  on the Home page, or under MENU -> Controller Mapping -> MIDI Mapping & Quick Reset -> TEMPLATES.


Finally, load a Sound preset from the list, selecting the the "Preset Manager" icon .




Editing

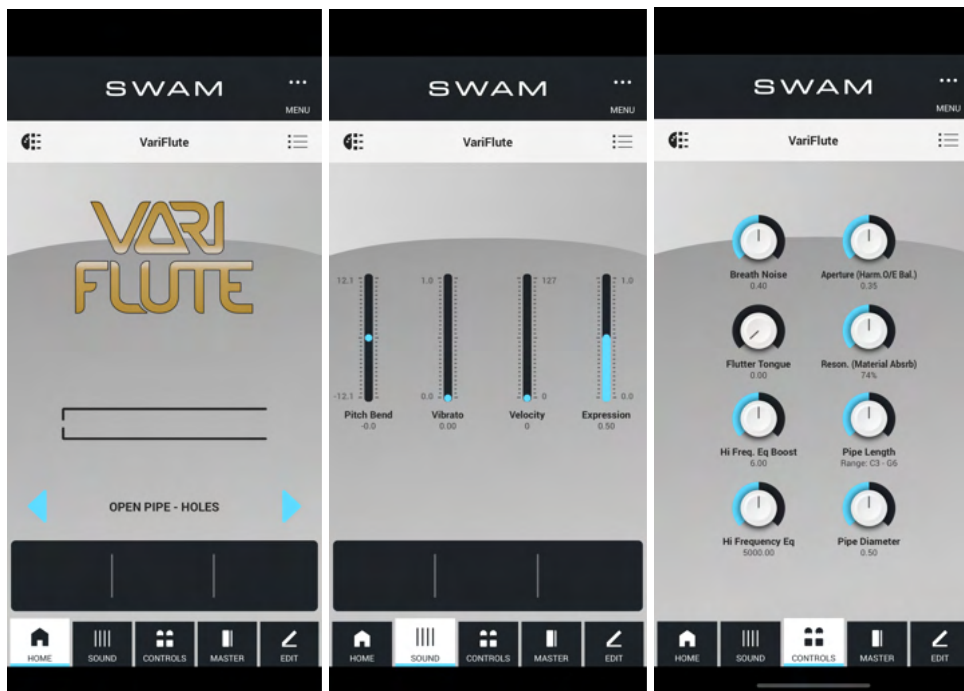
Portrait orientation is most suitable for editing the instrument, tweaking the sound, and performing advanced settings.

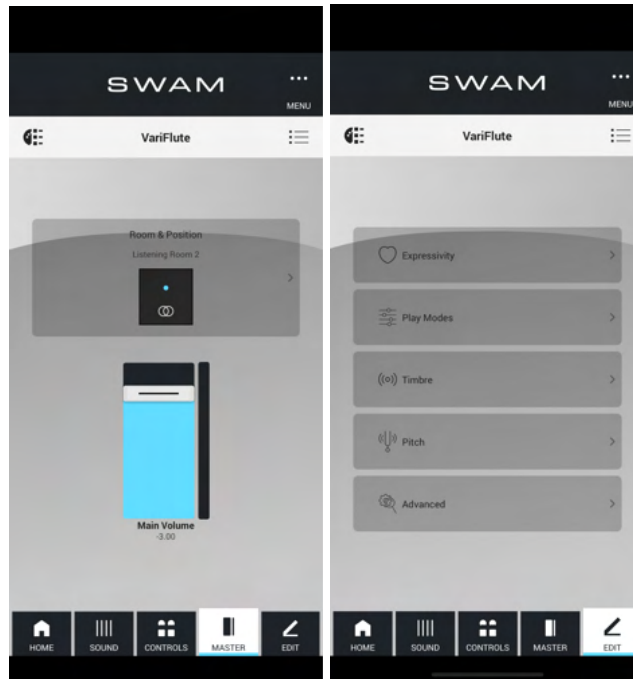
The ... (“three dots”) menu on the top-right corner is the same as in the desktop and iPad versions. Refer to the “Main Menu” paragraph for details.

The “MIDI Preset List” icon  gives you quick access to MIDI templates for a plug & play mapping of several external MIDI controllers.

The “Preset Manager” icon  is a shortcut to Sound presets selection and management.

On the iPhone, the Main Window has been split into five sections: Home, Sound, Control, Master and Edit. Use the navigation icons on the footer to reach the sections. Refer to the [Main Window](#) section and following chapters for details.



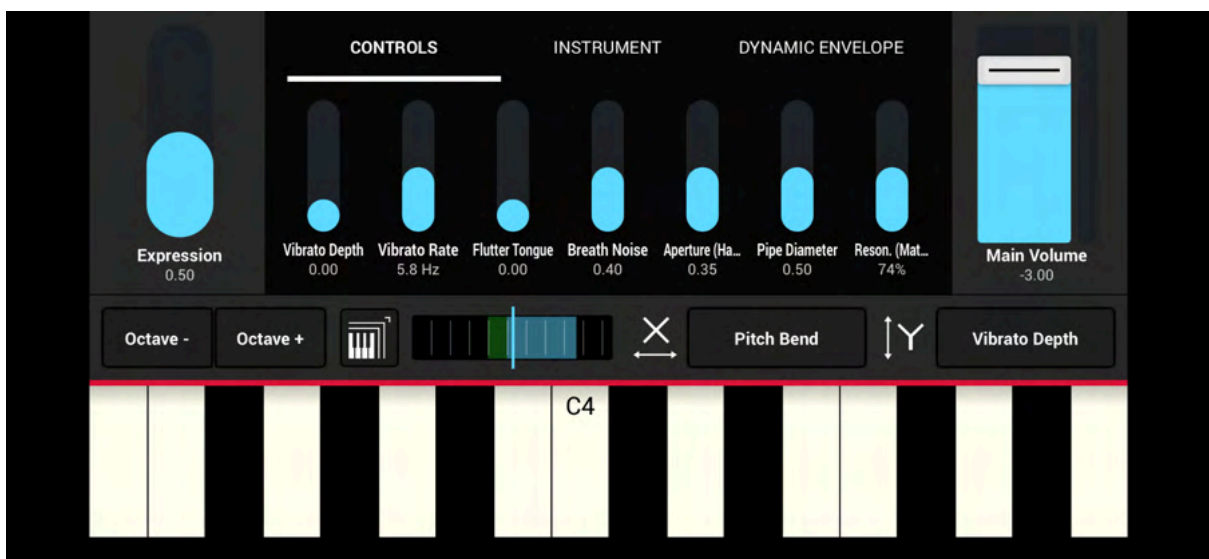


On-screen playing surface

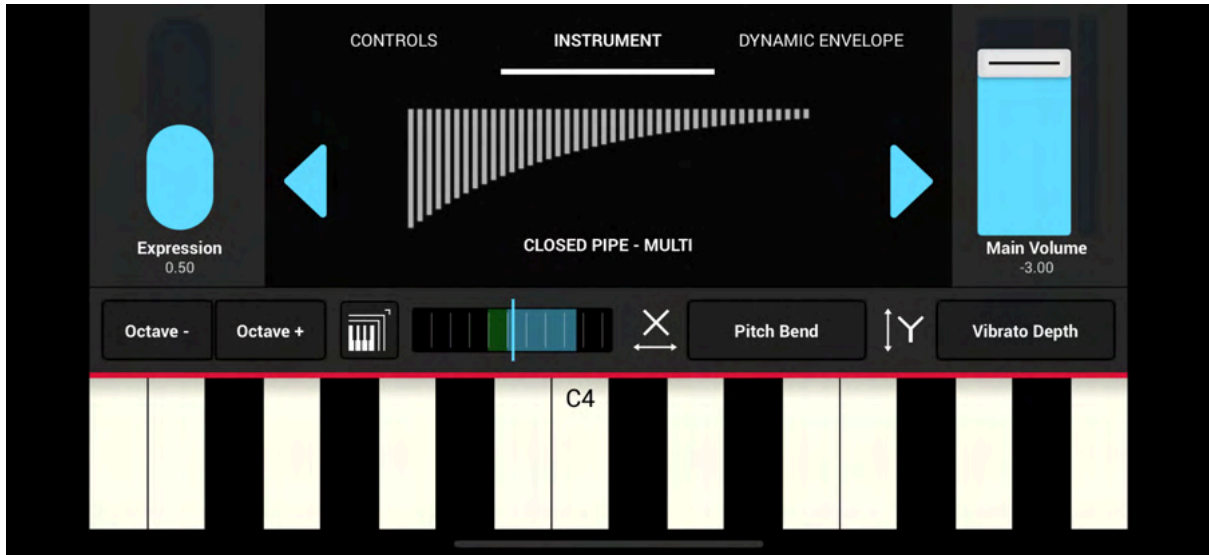
Be sure to select the “SWAM On-Screen Keyboard” entry from the list of MIDI presets, then rotate the iPhone to landscape orientation to access the on-screen playing surface.

Controls and features are identical to the iPad version. Please refer to the earlier [iPad section](#) for a detailed description.

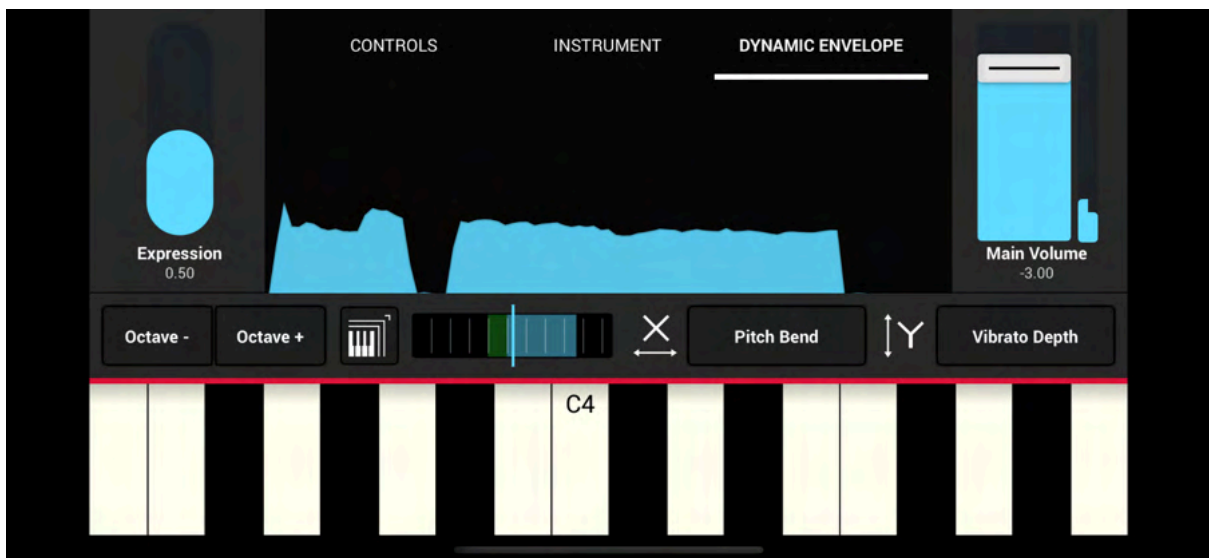
Controls



Instrument



Dynamic Envelope





Key Switches

Depending on the "KS Octave" parameter, Key Switches can be positioned beginning at any octave from C-1 to C2, or they can be disabled.

By default, the Key Switches are positioned starting from C1 (MIDI note 24), where C3 (MIDI note 60) = Middle C. You can change the MIDI channel from which Key Switches receive note events through the "KS Channel" setting. This can be useful when controlling Key Switches from a separate keyboard.



Instrument range

The set range of the VariFlute is of 4 and a half octaves, or 56 semitones, with a starting note dependent on the parameter "Pipe Length". This range includes an additional lower octave extension marked with a green hue on the virtual keyboard on screen. Considering all possible intonations, the effective range of the VariFlute is C1 – G7

Notes:

- Middle C can be switched from C3 to C4 in Main Menu -> Settings -> Options.
- Some default sound presets are transposed by plus or minus 12 semitones, depending on the instrument they're meant to emulate; this is done so that a good interpretation of the instrument's timbre can be achieved in the central octaves of the keyboard.



Tips and Troubleshooting

For comprehensive information, FAQs, and more detailed articles, please refer to our Knowledge Base at kb.audiomodeling.com.

No sound

The three most common causes for not getting any sound from a SWAM instrument are:

1. The audio device or audio output may not be correctly assigned. In the Standalone app, navigate to Main Menu -> Settings -> Audio, and select the proper audio device and output channels. If you are using a DAW or host, consult the user manual of the host application.
2. The MIDI device may not be correctly selected. In the Standalone app, navigate to Main Menu -> Settings -> MIDI, and select the proper MIDI device. If you are using a DAW or host, consult the user manual of the hosting application.
3. The Expression parameter may not have been moved, automated, or controlled by an external MIDI device since the instrument was instantiated.

Ours are expressive instruments. Unlike standard sample libraries, our instruments do not work until the Expression control is changed by an Expression pedal, Breath Controller, wheel, knob, slider, Wind Controller, Seaboard, LinnStrument, Touché, mobile App capable of sending MIDI data, or other MIDI CC11 source.

Can a saxophone emit a sound without blowing into it? Can a violin emit a sound without moving the bow?

Please watch this introductory playlist:

<https://youtube.com/playlist?list=PLT7gu1yXoV4HpBDsrDKbVjJKOIhttpsNAI>

We provide Factory presets for several MIDI controllers: click "MIDI", click "PRESETS", and choose a preset from the list

The default mapping for the Expression control at startup is the MIDI CC11, which is typically assigned to a keyboard Expression pedal.

The Expression assignment can be customized to match your controller: click "MIDI", click on the Expression Slider, and input the MIDI CC number.

For MIDI keyboards not equipped with an Expression pedal, a good start often is to map Expression to CC1 (Mod Wheel) and Vibrato Depth to AfterTouch (AT).



You can use the "Learn" button and move your controller. In this mode, the instrument recognizes the first incoming CC number and automatically assigns it to the Expression setting.

Even without a physical controller, on a DAW or sequencer you need to draw expression curves (or envelopes) or automation. Please refer to the user manual of your DAW in order to know how to provide MIDI CC curves or automation.

You can find "Getting Started" for most DAWs on our knowledge base <https://kb.audiomodeling.com/en/c/how-to>

Understanding Ambiente

What is Ambiente and why should I use it?

Ambiente is a sophisticated room simulator initially developed as an essential component of SWAM String Sections. Unlike standard reverb effects, Ambiente positions instruments within a 3D virtual space, simulating the reflections of sound waves through geometric calculations. This creates a more realistic spatial experience.

Why use Ambiente if you already have effects and reverbs?

Ambiente provides more immersive and precise spatial positioning than traditional reverb effects. It enhances the natural and authentic sound of SWAM instruments, significantly elevating the realism and coherence of soundscapes.

Can I move just one section to a different room?

No, the SWAM String Sections are designed to function as a unified entity within the same room environment to maintain consistency and avoid paradoxical situations.

What is the purpose of having multiple rooms in the Ambiente room simulator?

The Ambiente room simulator offers the flexibility to choose and shape sounds in different rooms, similarly to how different recording studios use various acoustic environments. Larger rooms can be used for string sections to produce a broad, reverberant sound, while smaller rooms can be used for solo instruments to create a more intimate sound.

Communication Between Instances

One of the key features of Ambiente is its intelligent communication between instances, including the Ambiente standalone effect plugin. Ambiente enables centralized control, allowing you to manage the position, microphone distance, and room properties for all sources from any instance of SWAM or the plugin.

Why do SWAM instruments need to use the local network?

With the introduction of SWAM String Sections and the 3.8.0 update for SWAM Solo Instruments, all products now feature the Ambiente room simulator. This simulator communicates with other plugin instances across the local network, allowing synchronized operations and settings across all instances, saving time, reducing errors, and ensuring consistent results.

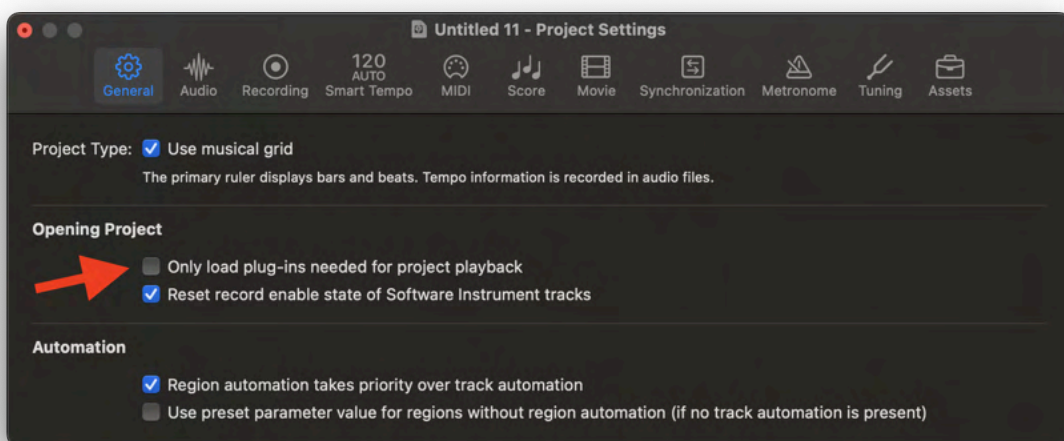
“Communication between instances failed” warning message

If you encounter a communication error between SWAM plugin instances, it may be due to insufficient network permissions. This issue can typically be resolved by ensuring that multicast communication is enabled for SWAM instances. For instructions on how to set local network permissions, please refer to the [Local Network Permission](#) section in this manual.

Issues when opening Logic Pro projects or templates

When opening Logic Pro projects or templates that have been saved without MIDI data, if the "Only load plug-ins needed for project playback" option is enabled in your project settings (File -> Project Settings), SWAM instruments in Ambiente will not be displayed until you open each plugin instance. This occurs because Logic Pro disables plugins on tracks without MIDI data, preventing Ambiente from communicating with the other SWAM instances until each plugin is selected and enabled.

We strongly recommend deselecting the "Only load plug-ins needed for project playback" option.





What are SWAM Templates?

Templates replace "Quick Reset" and "MIDI Preset" to clarify the difference between applying/resetting settings and recalling a complete preset. In the SWAM ecosystem, "Presets" mainly refers to the synthesis engine and sound engine data, combined with other settings like MIDI Mapping, Micro Tuning, and Room Simulator configurations.

When applying a template, you modify specific system parts, such as MIDI Mapping or Room Simulator settings, without altering the sound. This terminology shift helps users better understand and utilize the different functionalities within the SWAM ecosystem.

Why is it called the SWAM Ecosystem now?

With the introduction of SWAM String Sections and update 3.8.0 for SWAM Solo Instruments, all products now include the Ambiente room simulator, which is available also as a standalone plugin. This integration allows instruments and audio tracks to interact within the same virtual room, making it possible to build a cohesive orchestral sound.

Best practices for adding multiple solo instruments of the same type

When adding multiple solo instruments of the same type, it's essential to address potential phasing issues, especially when these instruments play in unison or occupy the same spatial position. Here are some best practices:

Understanding phasing issues

Phasing occurs when identical instruments play together, causing interference patterns. To mitigate these issues, SWAM instruments offer several solutions.

Utilizing the Ambiente room simulator

Ensure instruments do not overlap in the same position within the room simulator to avoid phasing issues. Carefully place each instrument in a unique position for a balanced and natural sound.

Customizing instrument characteristics

- **Different Instrument Bodies for Solo Strings:** Select different instrument bodies (e.g., Cremona, Firenze) to diversify sound characteristics.
- **Unison Anti-Phasing for Solo Brass:** Adjust the Unison Anti-Phasing parameter to minimize phasing problems.
- **Different Instruments for Solo Woodwinds:** Choose different woodwind sounds to avoid phase-related distortions.



- Using Divisi for orchestral sections: Employ the "divisi" technique to divide a section of instruments so they play different parts, reducing the risk of phasing issues.

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 login to the Customer Portal at <https://my.audiomodelin.com>, browse to the "Support" section, choose the appropriate category and follow the instructions to open a support Ticket .

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 DAW project that shows the issue is usually very helpful.