instruments of things®

SOMI-1 User Manual

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Firmware Hub Version: v0.2 (CHANGELOG)

Firmware Sensor Version: v2.6 (CHANGELOG)

Editor Version: v0.1 (CHANGELOG)

SOMI-1 Mobile App Version: v1.2.1

1. Important Notes

Please read carefully before processing

Warning!

Always follow the basic precautions listed below to avoid the possibility of serious injury from electrical shock, short circuiting, damages, fire or other hazards. These precautions include, but are not limited to, the following:

Do Not Open

This product contains no user-serviceable parts. Do not open the product or attempt to disassemble or modify the internal components in any way. If it should appear to be malfunctioning, discontinue use immediately and have it inspected by qualified Instruments of Things service personnel.

Location

Radio waves may affect electro-medical devices.

- Do not use this product near medical devices or inside medical facilities
- Do not bring this product within 15 cm (6 in.) of anyone having a heart pacemaker or defibrillator implant. Radio waves emanating from this product may adversely affect a heart pacemaker implant or defibrillator implant.

Water Warning

Do not expose the SOMI-1 Hub to rain, use it near water or in damp or wet conditions, or place on it any containers (such as vases, bottles or glasses) containing liquids which might spill into any openings. If any liquid such as water seeps into the SOMI-1 Hub, turn off the power of the hub immediately and unplug the USB-C cables from power supply. Then have the product inspected by qualified Instruments of Things service personnel.

If you notice any abnormality

If any of the following problems occur, immediately disconnect the electric plug from the outlet:

- It emits unusual smells or smoke.

Instruments of Things cannot be held responsible for damage caused by improper use or modifications to the instrument, or data that is lost or destroyed.

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2. Getting Started

1. Wake up the SOMI-1 motion sensors by touching the two metal pins on the backside of the sensor. The LED will turn on for a short time indicating that the sensors are ready to connect. If no connection is initiated within 10 minutes, the sensors go back to sleep mode to prevent battery drain.
2. Lay down the sensors and make sure they are not moved due to automatic calibration.
3. Connect the USB-C device port of SOMI-1 Hub (USB-C port in the middle) to your end device via the included USB-C cable (or Lightning to USB host adapter cable for iPhones). The hub will power on and the LED will start pulsating blue indicating that the hub is searching for sensors.
4. Wait until the LEDs of the motion sensors start blinking, indicating an active connection to the SOMI-1 Hub. Wait about 5 seconds after the LEDs of the sensors started blinking to let the sensors do an automatic calibration.
5. Put on the included wristbands and attach the sensors by pushing them onto the mounting. Make sure the LED of the motion sensors are aligned to right, otherwise some motion parameters are inverted.
6. SOMI-1 is now ready to be used with any MIDI compatible software or hardware.

Check out the SOMI-1 quick start guide to easily start with different setups: https://instrumentsofthings.com/pages/somi-1

3. Overview

SOMI-1 is available as a starter kit including the following components:

- 1x SOMI-1 Hub
- 2x SOMI-1 Motion Sensor
- 2x Wristbands
- 1x USB-C to USB-C Cable
- 1x SOMI-1 Editor
- SOMI-1 Sound app (approx. autumn 2022)

If desired, more motion sensors can be added to the SOMI-1 kit.

SOMI-1 can be used with any MIDI capable software or hardware, as well as with the SOMI-1 smartphone app for iOS and Android, which will be available soon. Detailed data processing parameters can be customized in real-time with the SOMI-1 editor, independently for each motion sensor and be saved directly on the SOMI-1 Hub making it suitable for DAWless setups, too.

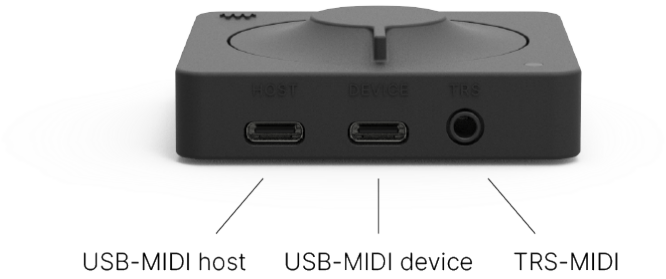
Up to six motion sensors can be used simultaneously with a single SOMI-1 Hub. The included wristbands allow wearing the motion sensors on both the feet and wrists. The motion sensors are waterproof and powered by CR2025 coin cells. If no connection is active between the motion sensors and the SOMI-1 Hub, the motion sensors automatically go to sleep mode after 10 minutes. When active, the battery life lasts for about 30 hours.

3.1 SOMI-1 Hub

The SOMI-1 Hub wirelessly receives the motion sensor data of the SOMI-1 motion sensors, converts them into MIDI data and outputs the MIDI data on its hardware ports. The SOMI-1 Hub offers USB-MIDI (host and device) ports as well as a TRS-MIDI port making it compatible with modern and vintage electronic musical instruments supporting MIDI. The different ports are described in more detail in the following list (from left to right):

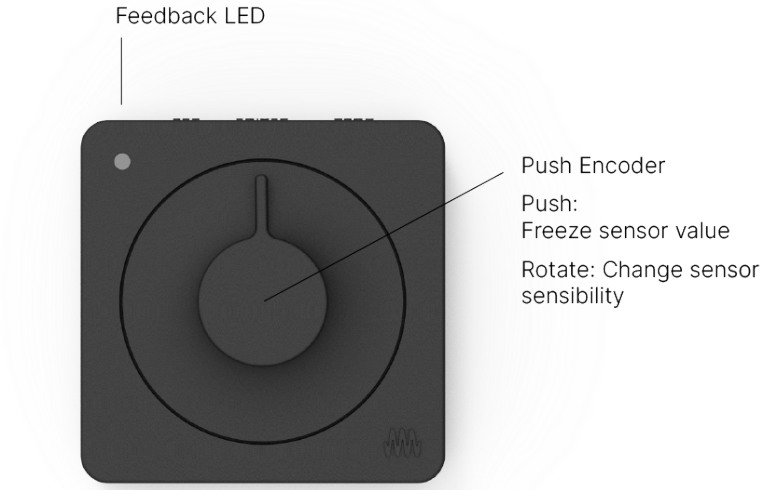
- USB-MIDI host port (to connect SOMI-1 directly to a standalone hardware synthesizer offering an USB-MIDI port)

- USB-MIDI device port and power supply (acts as a typical MIDI device)
- TRS-MIDI port (to connect SOMI-1 directly to a standalone hardware synthesizer offering a DIN-MIDI port via a TRS-MIDI Type-A adapter cable)



Note: No additional MIDI driver is required for common operating systems (class compliant MIDI).

UI Elements



The LED of the SOMI-1 Hub visualizes different states and interactions. For example, while the SOMI-1 Hub scans for nearby motion sensors, the LED is pulsating blue. A description of each state represented by a specific color or animation can be found in the following list:

LED States:

- Blue (pulsating): Scanning for nearby motion sensors to initiate a connection
- Blue (constant): Waits for Device Firmware Upgrade via Bluetooth
- White: Idle
- Red: Sensors are disabled
- Yellow: MIDI Control Change Controller is soloed
- Green: Applied currently shown settings
- Light Blue: Saved all settings to internal flash memory of SOMI-1 Hub

The push encoder allows interacting directly with SOMI-1. Turning the push encoder 360 degrees in clockwise direction doubles the sensitivity of acceleration X/Y/Z and activity parameters for all motion sensors and is indicated by the LED color (fades from blue, i.e. low sensitivity to red, i.e. high sensitivity). A short green LED color indicates normal sensitivity or rather middle position of the push encoder. Pushing the encoder shortly starts scanning for nearby bluetooth devices for a minute and enables / disables processing of incoming sensor data (the current sensor value freezes). Disabling / enabling the processing of sensor data is especially useful for live performances as you may want to only change sound parameters during specific phases of the performance. It's very much the same behavior as for guitar effect pedals. A red LED indicates that the sensors are disabled.

Furthermore the push encoder can be used to analyze the sensor data in real-time to solo the Control Change Controller with the highest value changes. This is a very useful feature when using MIDI Learn to map a specific movement parameter to a sound effect. More information can be found in the MIDI Specification section.

3.2 SOMI-1 Motion Sensor

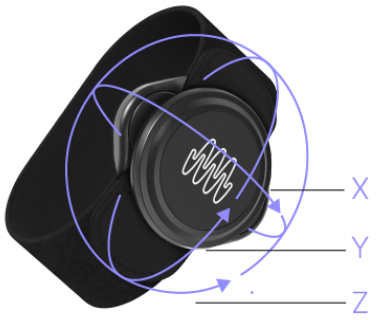
Each SOMI-1 sensor offers 7 different movement parameters to use – 3 gyroscope parameters (x, y, z), 3 acceleration parameters (x, y, z) and one activity parameter (based on the velocity of the sensor, independently of a direction).

Activity parameter

Move the sensor in any direction. The parameter value depends on the velocity. To solo the activity parameter by pushing the SOMI-1 hub encoder button, make fast circular movements.

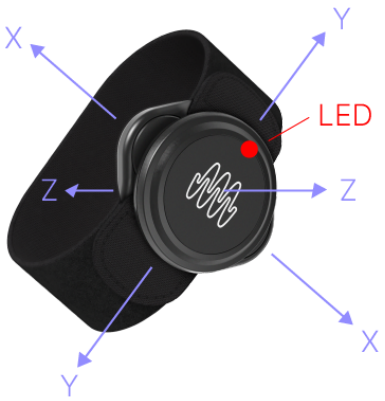
Tilt Angle parameters

Tilt the sensor around the X, Y or Z axis (left graphic). The parameter value depends on the ankle (right graphic: X showing to the top=highest sensor value of X-Axis, red dot=LED on sensor as reference).



Acceleration parameters

Accelerate the sensor along the X, Y or Z axis in the positive direction. If the sensor is not moved or moved in the negative direction of an axis (given the parameter is not inverted), the parameter value remains at 0. With a scale factor of 1.0, the maximum value corresponds to 4G (4x earth gravity). The earth gravity component of the acceleration parameters is filtered out (linear acceleration) to prevent unwanted behavior.



Calibration

To achieve highest possible precision, the motion sensors do an automatic calibration after they have been woken up from sleep mode. The calibration takes about 3 seconds and starts as soon as the sensor is connected to a SOMI-1 Hub (i.e. LED of the motion sensor starts blinking). During calibration, the sensors check if they are moved. If so, the calibration won't finish and the sensors wait until they are in a still position for calibration. Thus, make sure to lay down the sensors after they have been woken up and power on the SOMI-1 Hub afterwards. Wait about 5 seconds after the LED has started blinking to make sure the calibration has successfully finished.

Note: The middle position of the Tilt Z movement parameter depends on the direction of the sensor and is set during automatic calibration. The LED of the motion sensor corresponds to the middle position of Tilt Z.

Note: It's recommended to always wear the motion sensors with the LED pointing to the right direction. This makes sure that the movement parameters are not inverted and always have the same behavior.

Battery

The motion sensors are powered by CR2025 coin cells lasting for about 30 hours. The current battery levels can be shown in percent in the SOMI-1 app and SOMI-1 Editor for Live.

To replace the battery do the following:

1. Open the battery cover using a coin as a tool.
2. Replace the battery by inserting the replacement battery first into the battery cover, positive side up, and then pressing the sensor body on the battery cover. Make sure that the O-ring is in correct position in the groove on the battery cover before closing the battery cover. Please dispose of the old battery according to the local rules and legislation, treating it as battery waste. Do not throw it in the garbage.
3. Firmly close the battery cover. Make sure that the O-ring is not visible after closing the battery cover.

To prevent battery drain, the motion sensors automatically go to sleep mode after 10 minutes if no connection to a SOMI-1 hub is active. If a connection is active to a SOMI-1 hub, the LED of the motion sensor is blinking.

3.3 MIDI

SOMI-1 supports MIDI 1.0 with the following messages:

- Note On / Off
- Control Change (optional high resolution)
- Pitch Bend

The conversion of the movement data received by the sensors into MIDI data depends on the current settings, which can be independently customized for each movement parameter and MIDI message type. For example, one can select a desired movement parameter, which should be used as input to control a specific Control Change Controller. Between the conversion, one can scale the movement parameter increasing sensitivity, changing the slew rate for rising and falling values separately, etc.

Note: High resolution (14 bit) Control Change messages are an optional feature according to the MIDI 1.0 specification. Thus, make sure to check the MIDI specification of the software or hardware you want to use with SOMI-1 if it supports high resolution CC.

Note: By default, each sensor uses a dedicated MIDI channel starting from channel 1 (e.g. sensor 1 uses MIDI channel 1, sensor 2 uses MIDI channel 2, and so forth).

The resulting MIDI data is output on all hardware ports of the SOMI-1 Hub.

USB-MIDI

The USB-MIDI ports are class compliant. Thus, SOMI-1 can be used in combination with common operating systems offering a standard MIDI driver.

We have tested SOMI-1 with the following operating systems:

- Mac OS
- Windows
- Linux
- iOS
- Android

If you want to use SOMI-1 in combination with a host computer (e.g. laptop, mobile device) make sure to always use the USB-MIDI device port of the SOMI-1 Hub (port in the middle). This port is also used to power the SOMI-1 Hub.

If you want to use SOMI-1 with a MIDI hardware device offering a USB-MIDI device port, connect the USB-MIDI host port of the SOMI-1 Hub (port on the left) with a

corresponding USB cable to the USB-MIDI device port of your hardware instrument before powering on the SOMI-1 Hub.

Afterwards use a USB-C power adapter to power the SOMI-1 Hub via its USB-MIDI device port.

Note: Many MIDI hardware devices offer both, a USB-MIDI port and DIN-MIDI port. In this case we recommend to use the USB-MIDI port due to higher data transfer rate.

TRS-MIDI

There are still many hardware MIDI instruments around offering a DIN-MIDI port only. For this case the SOMI-1 Hub offers a TRS-MIDI port, which can be used with a corresponding TRS-MIDI to DIN-MIDI (Type A) adapter cable to connect SOMI-1 directly to the hardware MIDI instrument.

Note: There are two types of TRS-MIDI: Type A and Type B. SOMI-1 uses Type A. Thus make sure to buy the correct TRS-MIDI adapter cable, for example by Make Noise.

A drawback of the classic DIN-MIDI port is the low baud rate (31250 baud/s) or rather data transfer rate in comparison to USB-MIDI. If SOMI-1 is used with many motion sensors simultaneously sending several MIDI messages at once, the maximum data transfer rate may be exceeded leading to a packet loss. To address this issue, SOMI-1 automatically decreases the data transfer rate for Control Change messages to save bandwidth if a packet loss occurred. Note On / Off and Pitch Bend messages instead are never modified to prevent unwanted behavior, for example if a Note Off message is lost leading to a constantly pressed note.

MIDI Learn

Many hardware MIDI instruments and most MIDI compatible softwares offer MIDI Learn functionality to easily map a specific Control Change Controller to a desired sound parameter by selecting a sound parameter (e.g. filter cutoff) and changing the controller value. However, SOMI-1 continuously sends changes of several Control Change Controllers simultaneously making it very hard to map the desired movement parameter to a sound parameter.

To address this problem, SOMI-1 allows soloing a specific Control Change Controller for ease of mapping, which omits all MIDI messages except the soloed controller. A specific controller can **either** be externally soloed via the SOMI-1 Editor (explained in *SOMI-1 Settings Editor* section) **or** directly via the push encoder on the SOMI-1 Hub using real-time analysis of sensor data.

Solo by using the SOMI-1 editor (Ableton Live users can also use the SOMI-1 Max tool):

Choose your sensor in column one. Choose your desired movement parameter in column two. Press "Solo: Active". Use the MIDI Learn function of the connected MIDI software to map the currently soloed Control Change Controller to your desired sound parameter. When finished creating a mapping via MIDI Learn, press "Solo: Inactive".

Solo by using real-time analysis via the push encoder of the SOMI-1 hub:

To start data analysis, press the push encoder and keep it pressed constantly. The LED of the SOMI-1 Hub will start pulsating in random colors. Keep on pressing, take the motion sensor you want to solo and move it constantly and fast along the desired movement parameter (see section SOMI-1 Motion Sensor for parameter details). Release the push encoder while doing this movement. Now the corresponding Control Change Controller is soloed, indicated by a yellow LED color. Use the MIDI Learn function of the connected MIDI software or hardware to map the currently soloed Control Change Controller to your desired sound parameter. When finished creating a mapping via MIDI Learn, press the push encoder shortly to enable all configured MIDI messages again.

Note: A short press of the push encoder also starts scanning for nearby motion sensors for a minute indicated by a blue pulsating LED on the SOMI-1 Hub.

3.4 Technical Specification

In the following table you can find the technical specification of SOMI-1.

Max. Sensors per Hub	6
Max. Distance	50 Meters[1]

Overall Latency	< 10 milliseconds[2]
Movement Parameter	3D Tilt (X/Y/Z), 3D Acceleration (X/Y/Z), Activity
Battery Lifetime	Min. 30 Hours when active[3]
Wireless Protocol	Custom (Bluetooth® 5 based)
MIDI Version	1.0
Supported MIDI messages	Control Change (14 Bit), Note On / Off, Pitch Bend
MIDI Interface	USB-C Device, USB-C Host, TRS Type A
UI Elements	Push Encoder, RGB LED

[1] may vary depending on environment

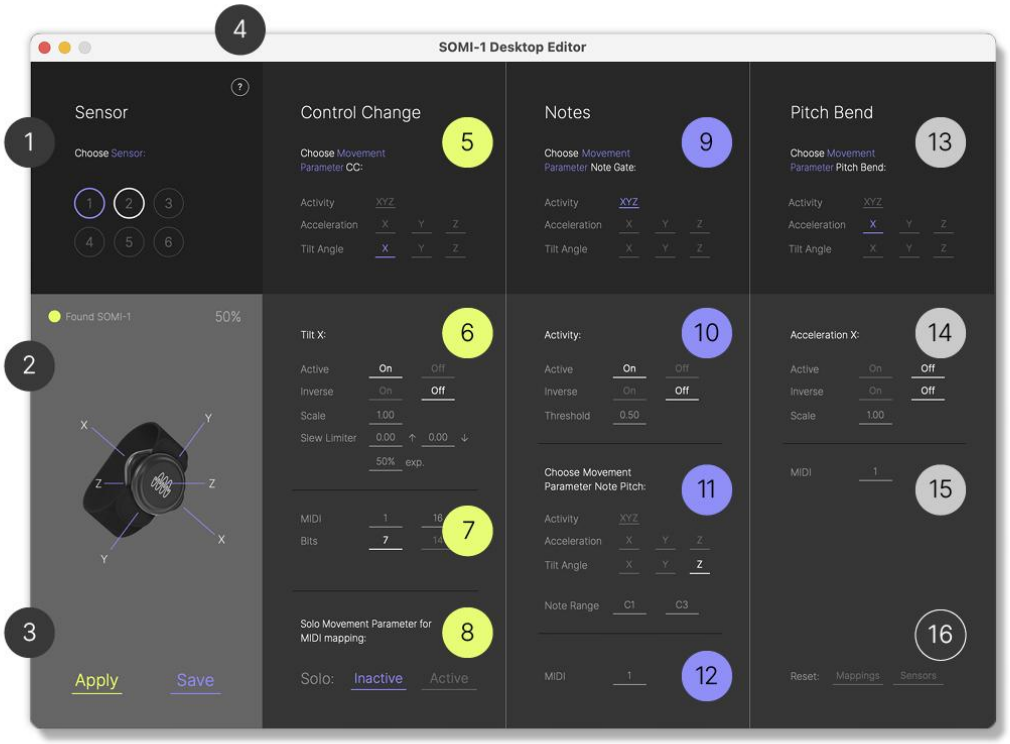
[2] depends on selected audio buffer size of external software

[3] automatic sleep mode if no connection is active for 10 minutes

4. SOMI-1 Settings Editor

SOMI-1 comes with two separate editors allowing detailed customization: a standalone editor and an editor specifically for Ableton Live (Max for Live).

4.1 Standalone



The SOMI-1 editor allows MIDI mapping (MIDI learn) and customization of SOMI-1 settings in real-time. The SOMI-1 Editor is separated in three main sections (from left to right):

- Sensor selection and general settings (1-4 & 16)
- MIDI Control Change settings (5-8)
- MIDI Note settings (9-12)
- MIDI Pitch Bend settings (13-15)

1. Display of sensors (1-6). Choose the sensor you want to edit.

   gray circle = sensor not connected
   white circle = sensor connected
   blue circle = sensor selected

2. Display of receiver status & display of battery status of selected sensor.

   - *Found SOMI-1 LED gray* = SOMI-1 is not connected
   - *Found SOMI-1 LED yellow* = SOMI-1 is connected

3. Apply button: Sends settings to SOMI-1 (**always** press apply after editing parameters).
   Save button: Saves settings on the SOMI-1 hub (settings are saved after unplugging the SOMI-1 hub).
4. Links to updates, manual, quick start guide and support page.

5. MIDI Control Change section. Choose the movement parameter of your selected sensor you want to edit (find movement parameters in manual section 3.2).

6. General *Control Change* settings of the selected movement parameter.

   Active = Turn parameter *on* or *off*
   Inverse = Inverse the parameter value (e.g. value down, when arm raised)
   Scale (0-10) = Scale the parameter value (sensitivity of the movement)
   Slew Limiter (0-1) = Add a slew limiter to smooth the values
   (↑ = raise time, ↓ = fall time, exp = linear to exponential in %)

7. MIDI settings of selected movement parameter.

   MIDI = Left value = MIDI channel, right value = MIDI controller number
   Bits = Change MIDI resolution from 7 to 14 bits (*attention*: not every software supports MIDI high resolution)

8. MIDI learn: *Solo* the selected movement parameter to map it to your desired sound parameter.

   Active = Solo is active, the parameter can be mapped
   Inactive = Solo is inactive, the parameter can not be mapped

Note: Always click Inactive after you have finished your MIDI mappings.

9. MIDI Note section – *Note Trigger* parameter. Choose the movement parameter of your selected sensor you want to use for triggering notes (find movement parameters in manual section 3.2).

10. General *Note* settings of the selected movement parameter.

    Active = Turn parameter *on* or *off*
    Inverse = Inverse the parameter value
    Threshold (0-1) = Change the sensitivity of the selected movement to trigger a note.

11. *Note Pitch* parameter. Choose the movement parameter of your selected sensor you want to use for changing the note's pitch (find movement parameters in manual section 3.2).

12. MIDI channel of the selected *MIDI Note* parameter.

13. MIDI Pitch Bend section – Choose the movement parameter of your selected sensor you want to use for pitch bend (find movement parameters in manual section 3.2).

14. General *Pitch Bend* settings of the selected movement parameter.

    Active = Turn parameter *on* or *off*
    Inverse = Inverse the parameter value
    Scale (0-10) = Scale the parameter value (sensitivity of the movement)

15. MIDI channel of the selected *Pitch Bend* parameter.

16. Reset the corresponding settings to factory defaults.

Note: Unfortunately Windows' builtin MIDI driver does not allow using the same MIDI device across multiple applications concurrently. As a workaround, the SOMI-1

Standalone Editor for Windows forwards the MIDI data to a (virtual) MIDI port named "loopMIDI" if found. A virtual, free MIDI driver for Windows can be found here matching the naming scheme by default. In your desired audio application, select the virtual MIDI driver "loopMIDI" as input allowing you to use the SOMI-1 Standalone Editor simultaneously with other audio applications (make sure to open the SOMI-1 Standalone Editor before your desired audio application!).

4.2 SOMI-1 Editor for Ableton Live (Max for Live Device)

For native integration with Ableton Live, SOMI-1 comes with a dedicated Max for Live device allowing customization of SOMI-1 settings in real-time. The different settings can even be automated within Live's arrangement to create different kinds of dynamic presets in a project.

Setting up SOMI-1 Editor for Live

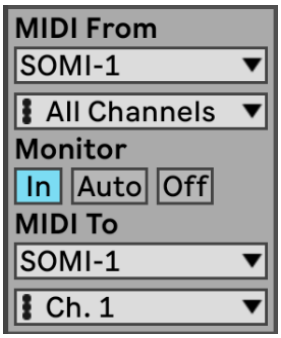
To get started, connect the SOMI-1 Hub to your computer and set up SOMI-1 in Live's MIDI preferences. Enable Track and Remote for Input and Track only for Output as shown in the following figure.

Note: We recommend changing the buffer size in Ableton Lives' audio preferences to 64 - 128 samples to reduce latency (delay).

Download the Max for Live Device SOMI-1 Editor for Live from the support page of our website: https://instrumentsofthings.com/pages/support

Create a new MIDI track in Live and add the SOMI-1 Max for Live device to it. You will notice the small circle next to Found SOMI-1 on the right is gray, indicating that SOMI-1 hasn't been discovered by Live yet. The reason for this is that no MIDI data is sent and received between Live and SOMI-1 yet. To enable the MIDI connection select SOMI-1 in

the MIDI From and MIDI To selection fields. Then select In for the Monitor of the track as shown in the following figure.



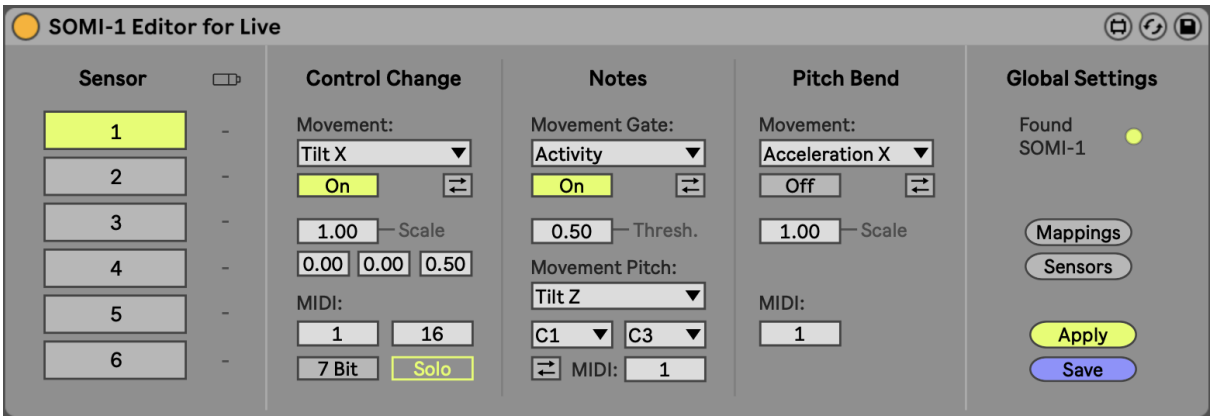
The gray circle in the SOMI-1 Max device will turn yellow indicating that a MIDI connection between SOMI-1 and Live has been established and SOMI-1 can be now configured via the Max device.

Note: You can also arm the MIDI track in Live to enable a connection between Live and SOMI-1. However, when adding new tracks in Live, arm is disabled in the SOMI-1 MIDI track. Thus, we recommend setting the Monitor to In instead.

Attention! If another track is soloed in Live, no MIDI data is transferred between SOMI-1 and Live! Thus always make sure that the MIDI track in Live containing the SOMI-1 Max device is soloed as well or disable solo for other tracks!

Using SOMI-1 Editor for Live

After the SOMI-1 Editor for Live has been set up as explained in the section before, it should look as shown in the following figure.



The SOMI-1 Editor for Live is separated in three main sections (from left to right):

- Sensor Select
- MIDI Settings
- Global Settings

Note: You can hover the mouse over the different UI elements of the SOMI-1 Editor for Live to get more detailed information.

Note: Currently shown settings are only updated on the SOMI-1 Hub by clicking the Apply button.

Note: The Save button persists all currently internal settings of the SOMI-1 Hub to its flash memory making them available after power off.

Note: Internal settings are not saved if Control Change Solo is active (LED on hub is yellow) or sensors are disabled (LED on hub is red)!

Attention! Saving the current internal settings of the SOMI-1 Hub will override all previous settings!

Sensor Select Section
Selects the sensor, which should be configured and shows the battery levels of all currently connected sensors. The currently shown settings in the MIDI section correspond to the currently selected sensor.

MIDI Settings Section (Control Change, Notes, Pitch Bend)
Allows customization of the supported MIDI messages of the currently selected sensor.

Control Change:
Each movement parameter corresponding to a Control Change Controller can be configured independently. Thus the currently shown settings depend on the selected movement parameter. Each movement parameter can be disabled, inverted, scaled, smoothed, etc. Furthermore, SOMI-1 supports high resolution (14 bit) Control Change messages, which are suitable for high precision requirements such as pitch modulation.

The Solo / Unsolo toggle button is explained in the section Using Live's MIDI Learn Functionality.

Notes:
In comparison to Control Change settings, the Note settings are unique for each sensor. Thus the currently shown settings are independent of the selected movement parameters. Furthermore, two movement parameters are required as input. One to distinguish if a note is currently played (i.e. Note On / Off) and another one corresponding to the note pitch. The threshold parameter defines the two areas corresponding to Note Off and Note On messages within a normalized range (i.e. incoming movement parameter values below the threshold correspond to Note Off, everything above the threshold to Note On). Thus, by decreasing the threshold value, the sensitivity is increased. Furthermore, the note pitch range can be set corresponding to the full scale input movement parameter. For example, when selecting Tilt Z as input parameter for note pitch, the note range corresponds to 360 degree range. When using an acceleration based movement parameter (i.e. Acceleration X/Y/Z or Activity) as gate input and the parameter is inverted, notes are held and only changed when accelerating the sensor.

Pitchbend:
Similar to Notes, Pitch Bend settings are unique for each sensor.

Global Settings Section:
The Global Settings correspond to the SOMI-1 Hub itself and are independent of the sensors. Both Mappings and Sensor buttons reset the corresponding settings to factory defaults. However, they don't override the settings in the internal flash memory of the SOMI-1 Hub. The Mappings button corresponds to all MIDI settings, the Sensor button to meta information such as Bluetooth address, which is used to always use the same settings for a single sensor.

The Apply button updates the currently shown MIDI settings on the SOMI-1 Hub. Thus all settings for other sensors won't be modified.

The Save button overwrites all settings in the internal flash memory of the SOMI-1 Hub to keep them after powering off the hub (make sure no Control Change solo is active, i.e. yellow LED or a sensor is disabled).

Using Live's MIDI Learn Functionality

Live's builtin MIDI learn functionality allows mapping of MIDI Control Change Controllers to one or sound parameters and macros. Typically, one selects the desired sound parameter and changes the value of a Control Change Controller to create a new mapping. However, SOMI-1 typically sends several Control Change messages for different controllers simultaneously making it hard to map a specific movement parameter to the desired sound parameter. Thus, SOMI-1 allows soloing a specific Control Change Controller or rather movement parameter.

To solo a specific controller, select the desired sensor (column 1) and movement parameter (column 2) and click the *solo* button. You will notice the LED on the SOMI-1 Hub turns yellow indicating that only a single Control Change Controller is active. Click *unsolo* after you have done the mapping.

Note: When soloing a Control Change Controller, Note On / Off and Pitch Bend messages are disabled as well.

Attention! Before opening Live's MIDI Editor make sure you have already selected the sound parameter you want to map! Otherwise you may create unwanted mappings, for example if you have selected a clip in Live's Session View.

5. SOMI-1 Mobile App

The SOMI-1 Mobile App offers ready-to-use soundscapes and especially focuses on users without pre-knowledge in electronic music production and MIDI controllers. Each soundscape offers a variety of sound parameters, which can be mapped to desired movement parameters. To get started quickly, each soundscape comes with a preset mapping. The preset mapping of each soundscape can be customized and saved. The SOMI-1 Mobile App is compatible with both iOS and Android.

Prerequisites

Download and install the SOMI-1 Mobile App from App Store / Play Store.

Note: If you are using an iPhone, you need a Lightning to USB adapter cable with host (OTG) functionality, for example this one, which additionally offers an audio output jack. If the LED of the SOMI-1 Hub does not start pulsating blue, you probably don't use an adapter cable with host functionality.

Note: When using external headphones or loudspeakers connected via Bluetooth, the delay time (i.e. latency) heavily increases. Thus, we recommend using cable connections to external audio systems only.

Getting Started

To get started with the SOMI-1 Mobile App, follow these steps:

1. Wake up sensors by touching the two metal pins on the backside (LED turns red for a short moment).
2. Lay sensors down to make sure they are not moved due to automatic calibration (LED of sensors should point in the direction away from you, i.e. our logo has the correct orientation).
3. Connect the SOMI-1 Hub via the included USB-C cable (or an adapter cable) to your mobile device (LED on hub starts pulsating blue).
4. Wait until all LEDs of the sensors start blinking. As soon as the LEDs start blinking, wait a few more seconds to make sure sensors are calibrated correctly.
5. Open SOMI-1 Mobile App (LED on hub turns green for a short moment indicating a successful transmission of the currently selected soundscape settings).
6. Put on bracelets and attach sensors to it so that LEDs on sensors pointing to the right direction.

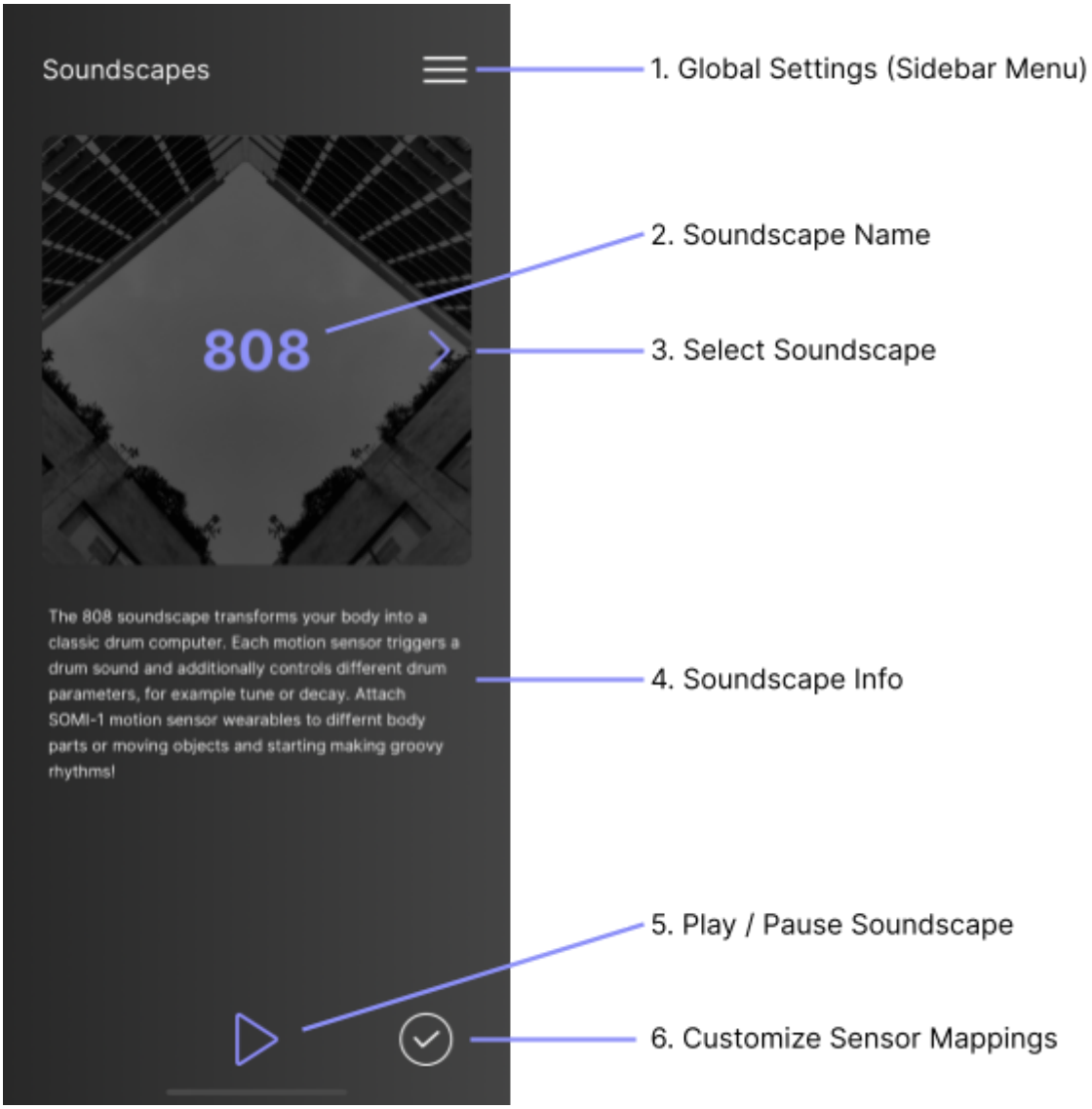
7. Select a desired soundscape by clicking on the next / previous button on the cover art (LED on hub turns green for a short moment everytime you change the soundscape).

Overview

The following section describes the app views to customize soundscape mappings and change audio settings.

Main View

The main view of the SOMI-1 mobile shows the currently selected soundscape with its covert art and related description.



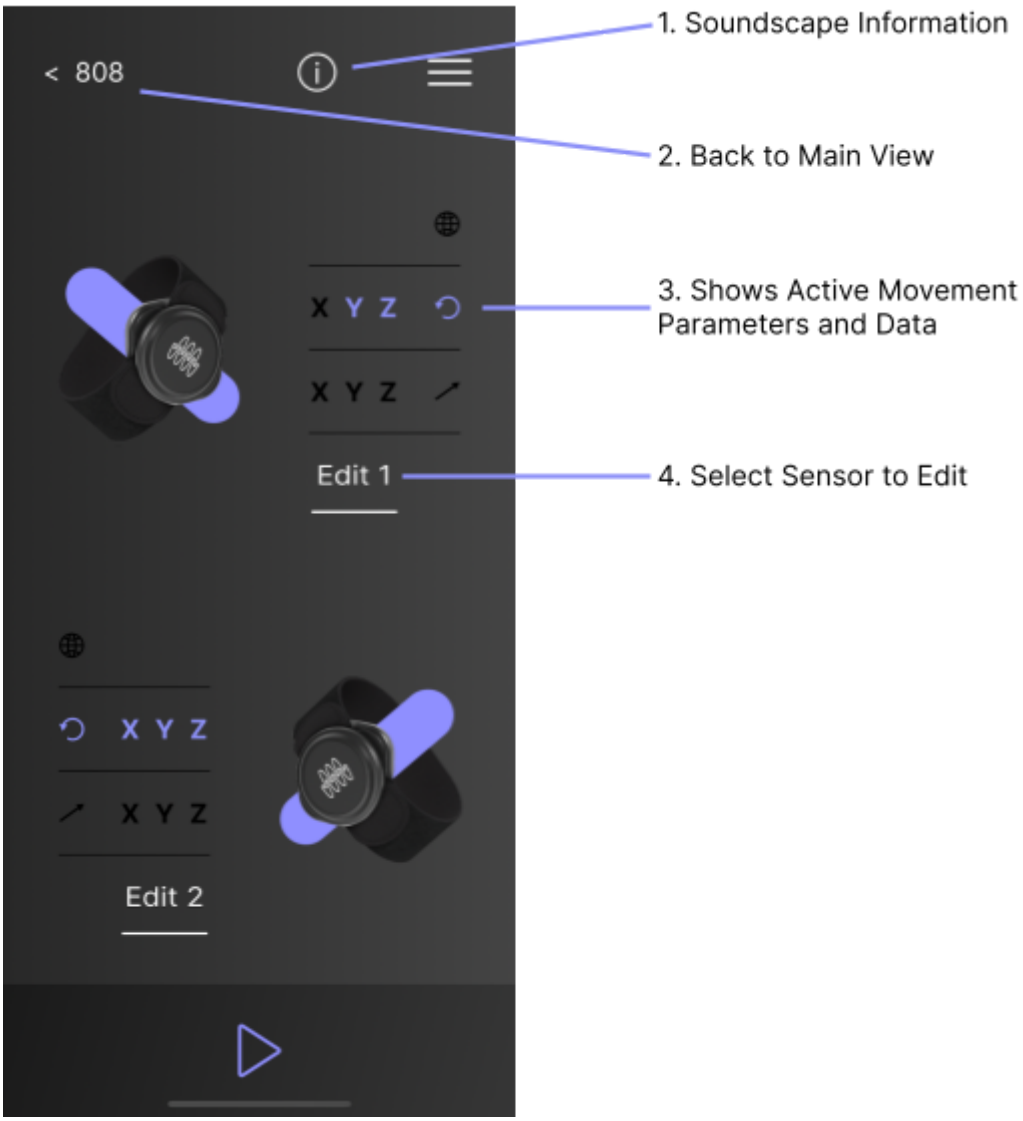
Description of UI elements:

1. Show sidebar menu to change audio device settings and show user information.

2. The name of the currently selected soundscape.
3. Next / Previous buttons to select a new soundscape.
4. Generic information about the currently selected soundscape.
5. Buttons to play / pause current soundscape.
6. Open sensor select view to customize movement to sound parameter mappings for currently selected soundscape.

Sensor Select View

The sensor select view shows active movement to sound parameter mappings as well as real-time movement data. Mappings of a specific sensor can be changed by clicking the according edit button.

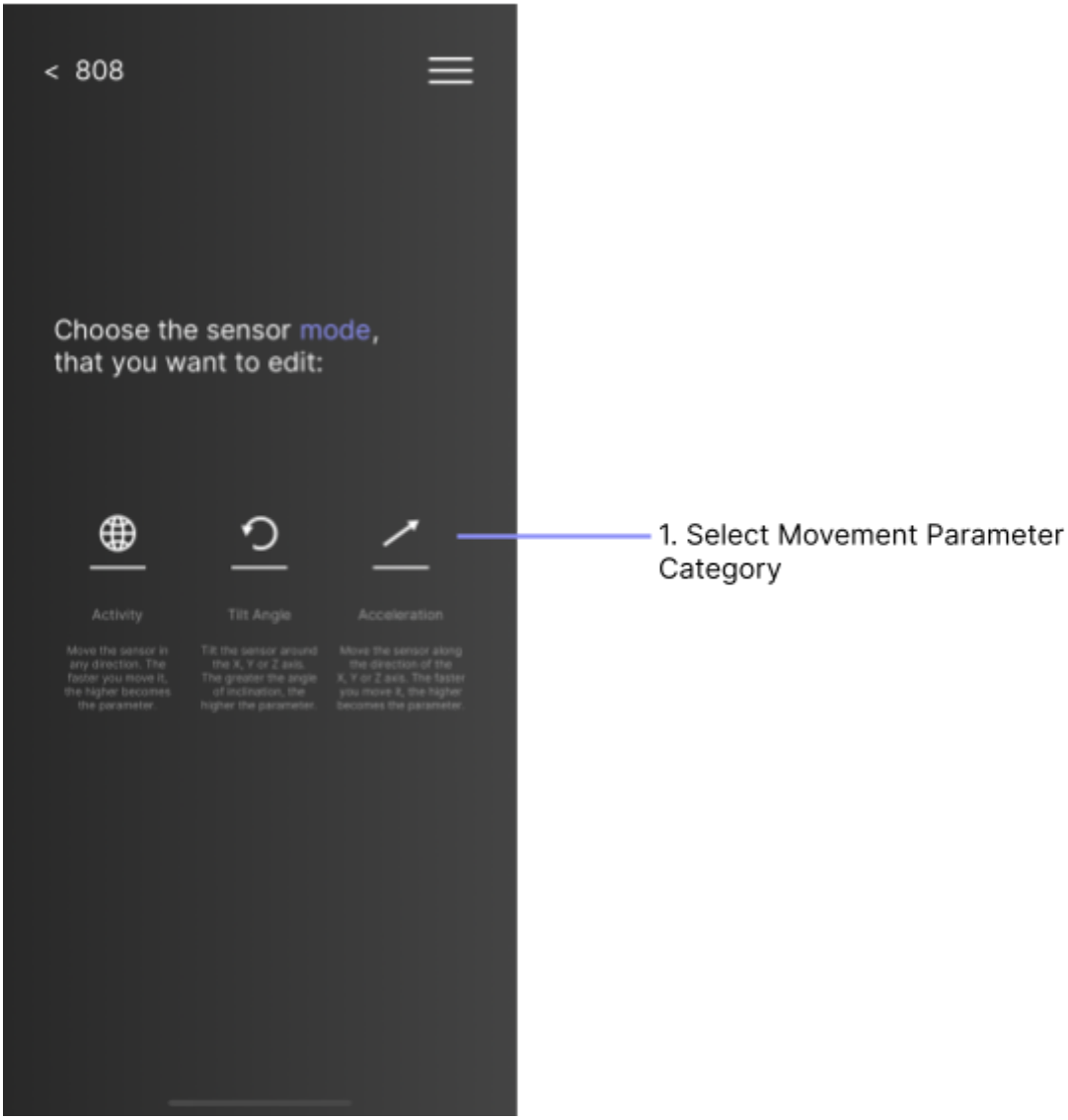


Description of UI elements:

1. Shows meta information about the current soundscape (e.g. author, license, etc.).
2. Button to go back to the last dialog view.
3. Shows active movement parameters. Violet indicates that the specific movement parameter is mapped to a sound parameter of the current soundscape. Different greyscales correspond to the currently received movement data.
4. Button to edit mappings for a specific sensor.

Movement Parameter Category Select View

The available movement parameters of each sensor are divided in 3 categories: Activity (single parameter, combination of 3D acceleration), Tilt Angles (3D), Acceleration (3D).

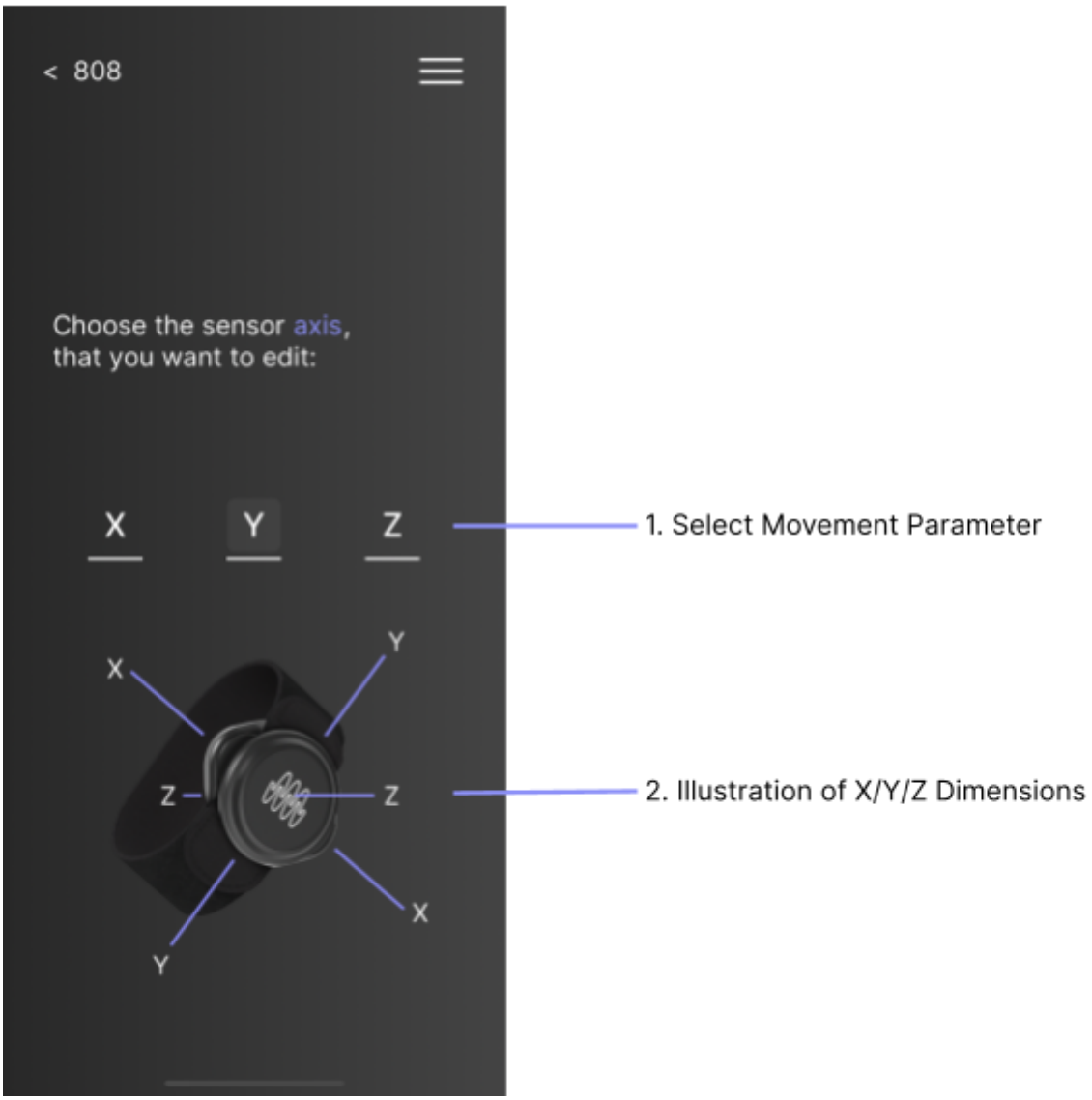


Description of UI elements:

1. Select one of the movement parameter categories (if you select Activity, you will jump directly to the sound parameter select view, as Activity is an one-dimensional parameter)

Movement Parameter Select View

If you have selected the tile angle or acceleration category in the previous view, next you have to choose the direction of the movement parameter as illustrated in the sensor figure.

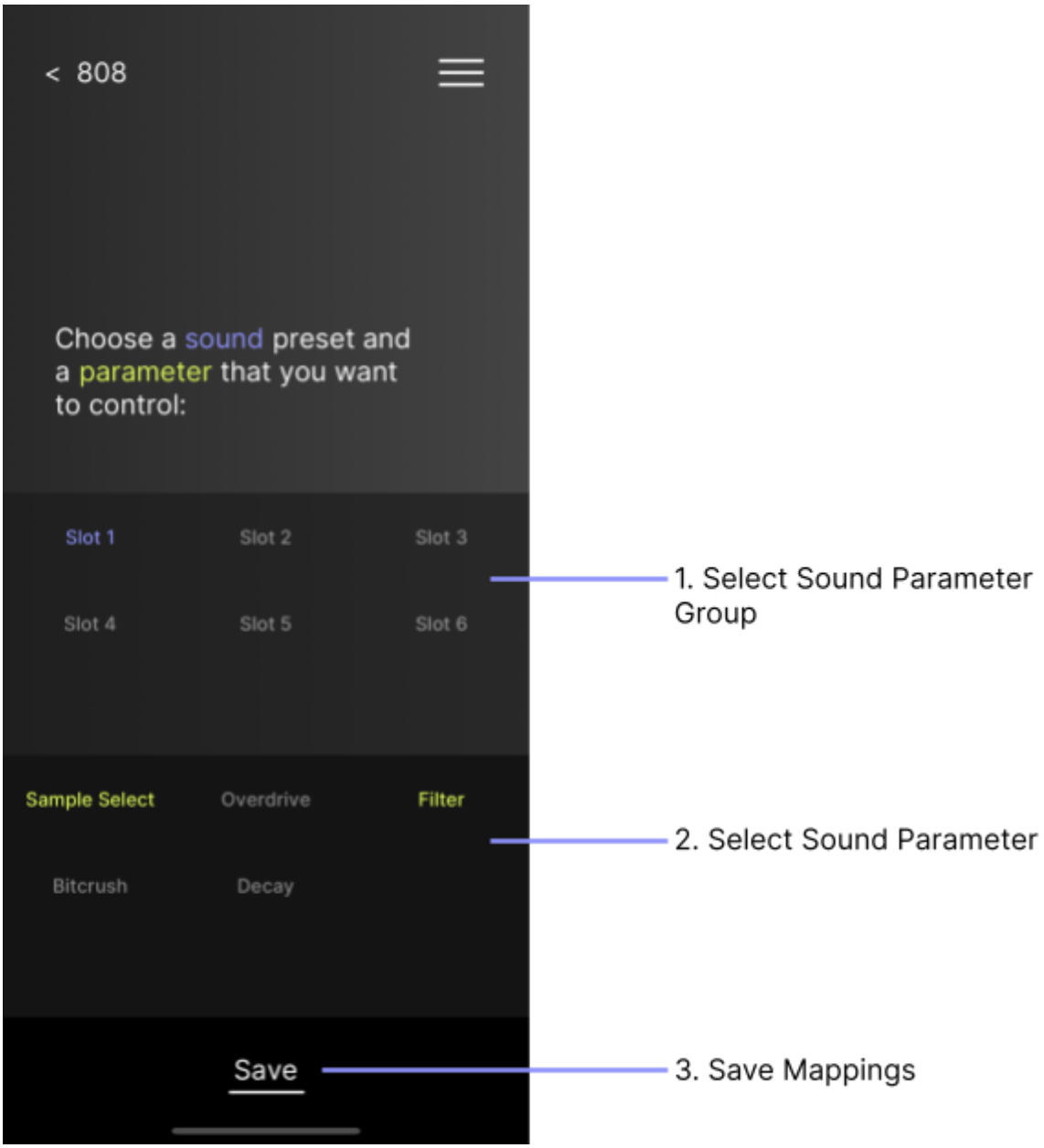


Description of UI elements:

1. Buttons to select direction of the movement parameter according to the previously selected category.
2. An illustration of the different movement parameter directions per category.

Sound Parameter Select View

The sound parameter select view allows mapping of the previously selected movement parameter to a sound parameter of the current soundscape. New Mappings take effect immediately after clicking a sound parameter button. If you want to keep your custom mappings, you can save them to be available after closing the SOMI-1 Mobile App.



Description of UI Elements:

1. Select instruments or sound (each soundscape has a variety of sound parameter groups, where each group corresponds to a single instrument or sound)
2. Map the previously selected movement parameter to a sound parameter (changes take effect immediately)

3. Save the current soundscape mappings to be available after closing the app (this includes ALL mappings). This will overwrite the old mappings.

Sidebar Settings View

In the sidebar, you can find global app settings and user information. In general settings, you can change the block size of the audio backend. The block size corresponds to the delay time of data processing (i.e. latency). Thus, the lower the block size, the better the response time. However, on older devices, especially on Android, small block sizes may lead to audio issues due to heavy processor load. In this case, increase the block size to a higher value.

Creating Soundscapes

The SOMI-1 Mobile App allows external sound designers, who are experienced with the open-source visual programming environment Pure Data, to create their own interactive content for the SOMI-1 Mobile App. For this, an easy-to-use plugin architecture has been developed allowing to expose sound parameters, creating preset mappings and include various meta information in the app. The SDK will be released with detailed information in the next SOMI-1 app update.

If you are already interested, feel free to contact us at support@instrumentsofthings.com.

6. Firmware Upgrade

Both the SOMI-1 Hub as well as the SOMI-1 motion sensors can be updated with any mobile device (iOS or Android) supporting Bluetooth LE.

Prerequisites

First, install the nRF Device Firmware Update app on your mobile device:

- iOS: https://apps.apple.com/us/app/nrf-device-firmware-update/id1624454660
- Android: https://play.google.com/store/apps/details?id=no.nordicsemi.android.dfu

Download the recent firmware Zip archive for the SOMI-1 Hub or Sensors from our website to your mobile device and save it (do not extract the Zip archive!).

Open the nRF Device Firmware Update app, click on the *Select* firmware file button and choose the downloaded Zip archive.

Next, the SOMI-1 Hub or rather motion sensors have to be set to update mode, which is described separately in the next steps.

SOMI-1 Hub

To put the SOMI-1 Hub in update mode, press the push encoder on the hub and keep it pressed while connecting the hub to a power supply via the USB device port (port in the middle). As soon as the LED is constantly blue, you can release the push encoder. Make sure the LED is still constantly blue signaling it is in update mode.

Note: If no update is transferred within 2 minutes, the hub reboots to normal mode again and can't be updated (i.e. pulsating blue LED signaling discovery mode and constant white LED afterwards signaling idle mode).

In the nRF Device Firmware Update app, click on the *Select* device button and select *SOMI-1 DFU* device.

Note: If you don't find the device SOMI-1 DFU, the hub is not in update mode. Make sure that you have followed the steps described before.

Click on the *Upload* button and wait until the upload progress has successfully finished. After successful update, the SOMI-1 Hub will automatically reboot to normal mode and is ready to use (LED starts pulsating blue).

Note: Only our signed firmware can be used with SOMI-1. If you update the hub with another firmware, the hub will fall back to the previous version.

Note: The SOMI-1 Hub firmware can be only executed on our SOMI-1 hardware. If the LED is constantly red, you don't own an original SOMI-1 hub or the firmware has been modified leading to a guarantee loss!

SOMI-1 Motion Sensor

Make sure the SOMI-1 motion sensors are in sleep mode (the metal pins on the backside were not touched nor the sensors were connected to the SOMI-1 Hub for 10 minutes).

Note: The following steps require strict timing. Thus, read the whole section before starting the update procedure.

Touch and keep touching the two metal pins on the backside of the sensor until the LED starts blinking red. Release the touch pins immediately, when the LED starts blinking. The LED should be constantly red now otherwise the sensor is not in update mode!

Note: If no update is transferred within 1 minute, the sensor reboots to normal mode again and can't be updated anymore (no constant red LED).

In the nRF Device Firmware Update app, click on the *Select* device button and select *DfuTarg* device.

Note: If you don't find the device DfuTarg, the sensor is not in update mode. Make sure that you have followed the steps described before.

Click on the *Upload* button and wait until the upload progress has successfully finished. After successful update, the SOMI-1 sensor will automatically reboot to normal mode and is ready to use (LED starts blinking red when sensor is connected to the SOMI-1 Hub).

Note: The SOMI-1 motion sensor firmware can be only executed on our motion sensors. If the LED is constantly red for more than 1 minute, you don't own an original SOMI-1 motion sensor!

7. Best Practices

- Make sure to wear the sensors such that the LED is pointing to the right direction to make sure that no movement parameters are inverted.
- Use acceleration based movement parameters (Acceleration X/Y/Z or Activity) to percussion or one shot sounds. Use tilt angles if you want to hold notes. You can also use acceleration based values if they are inverted to hold notes.
- When creating a new mapping in Ableton Live, make sure to select the desired destination parameter in Live before opening the MIDI editor for mapping to prevent unwanted mappings.

8. Troubleshooting

The sensors are blinking but I don't receive MIDI data.
Make sure that the sensors are calibrated. Thus, lay them down for at least 5 seconds after the LED of the sensors started blinking. If the problem still occurs, ***update*** the SOMI-1 Hub firmware to the most recent version (see section 6).

The SOMI-1 Hub LED does not start pulsating blue when connecting to my iPhone.
Make sure to use a Lightning to USB adapter cable with host (OTG) functionality, for example this one, which additionally offers an audio output jack.

I don't receive MIDI data on my hardware instrument from the SOMI-1 USB-MIDI host port.
Make sure to connect your hardware instrument to the USB-MIDI host port of SOMI-1 before powering on SOMI-1. If you still don't receive MIDI data, make sure your hardware MIDI instrument is USB-MIDI class compliant (i.e. no additional drivers required).

SOMI-1 is not found in the SOMI-1 Editor for Live (Max for Live).
Make sure to enable "Track" and "Remote" for SOMI-1 MIDI input and "Track" for SOMI-1 MIDI output in Live's global settings. Furthermore, select SOMI-1 as MIDI input and output in the track settings where the SOMI-1 Editor for Live is located. Lastly make sure MIDI data is received by either setting the monitor to "In" or arming the track (record enable). Keep in mind that no MIDI data is transferred to the Max for Live device, if you enabled solo for another track in Ableton Live.

I get weird behavior in Ableton Live after mapping a parameter.
You may have accidentally mapped a movement parameter to track select or other transport settings of Live. Open the MIDI mapping view and delete the mapping. Make sure to unselect any transport parameter or similar before enabling mapping in Live.

New parameter settings changed in SOMI-1 editor are not applied.
Make sure to click the apply button to transmit your settings to SOMI-1 and observe the LED on the SOMI-1 hub turning green for a short moment.

My SOMI-1 settings are not available anymore after powering off SOMI-1.
Make sure to click the Save button in the SOMI-1 Editor to write current settings to the hub's internal flash memory. Also keep in mind that settings are not saved if a Control Change controller is soloed (LED on the SOMI-1 hub is yellow) or sensors are disabled (LED on the SOMI-1 hub is red).

I get weird behavior of parameters.
Make sure the parameter settings are set correctly in the SOMI-1 editor. If you still experience issues, you can reset the parameter settings to factory defaults by clicking the Mappings button in the SOMI-1 editor.

I can't use the SOMI-1 editor while using Ableton Live or another music software (Windows).
Unfortunately the builtin MIDI drivers of Windows don't allow concurrent access to a single MIDI device across multiple applications. However, installing the free Asio4All driver should fix this and furthermore allows lower latencies if you don't use a professional audio interface offering native ASIO drivers.

If you experience issues with your SOMI-1 that cannot be solved by reading this manual, please contact support@instrumentsofthings.com. Make sure to include a detailed description of your problem including operating system and used software or hardware. Screenshots and videos are appreciated so we can help you as quickly as possible.

9. FAQ

Does SOMI-1 support Bluetooth® MIDI?

No, SOMI-1 uses a custom wireless transmission protocol to achieve best possible latencies and resolution of sensor data.

Can the SOMI-1 motion sensors be used with other devices?

Yes, but only with our 2.4SINK Eurorack module as we use a custom wireless transmission protocol.

How many motion sensors can be used simultaneously with a single SOMI-1 hub?

Up to six SOMI-1 motion sensors can be used simultaneously.

How are the motion sensors powered?

The motion sensors are powered by CR2025 coin cells.

How long do the motion sensor batteries last?

Typically the battery lasts for over 30 hours if the sensor is active and connected to the SOMI-1 Hub. Otherwise the sensor goes to sleep mode to prevent unwanted battery drain. However, this also depends on the quality of the battery which is used. Thus we recommend using CR2025 coin cells by well known brands with long life time.

Are the motion sensors waterproof?

Yes, the motion sensors are waterproof up to 30 meters.

How do I use SOMI-1 directly with my hardware MIDI device?

Typically, hardware instruments supporting MIDI offer a USB-MIDI device port and/or a DIN-MIDI port. For best performance, we recommend using the USB-MIDI port if available due to higher data transfer rate. Note that the USB device port of the used hardware has to be MIDI class compliant. To use a SOMI-1 with a device offering a DIN-MIDI port only, a TRS-MIDI Type A adapter cable is required.

How do I make sure that sensors keep the same order after powering off the SOMI-1 Hub?

As soon as all sensors are connected to the SOMI-1 Hub (i.e. LEDs of sensors are blinking red), click on the *Save* button in the editor. This assigns a fixed ID to each sensor, so that they keep the same order after powering off the SOMI-1 Hub.

How do I change the order of the sensors?
Make sure no sensors are connected to the SOMI-1 Hub. Click on the *Sensor Reset* button in the editor and afterwards the save button to overwrite the settings in the internal flash memory of the SOMI-1 Hub. Disconnect the SOMI-1 Hub from power supply and reconnect it. The first sensor which is discovered corresponds to the first ID or rather slot, and so forth. Click on the *Save* button to write the new sensor order to the SOMI-1 Hub's internal flash memory.

10. Declaration of Conformity

This product meets the regulations for CE and FCC conformity.
This product underlies the guidelines of WEEE authority.