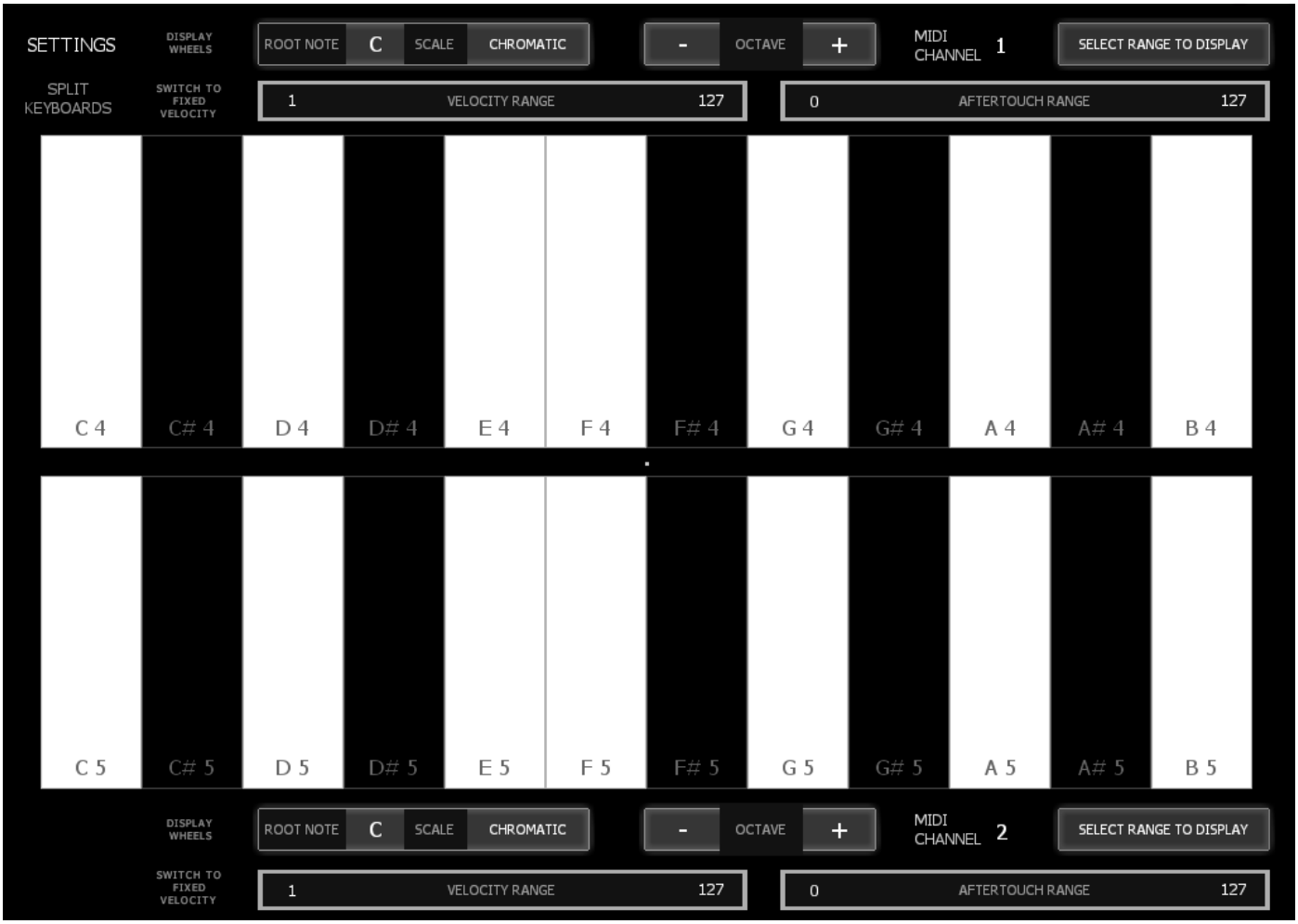
Advanced Keys v3

Lemur piano keys with velocity and aftertouch support



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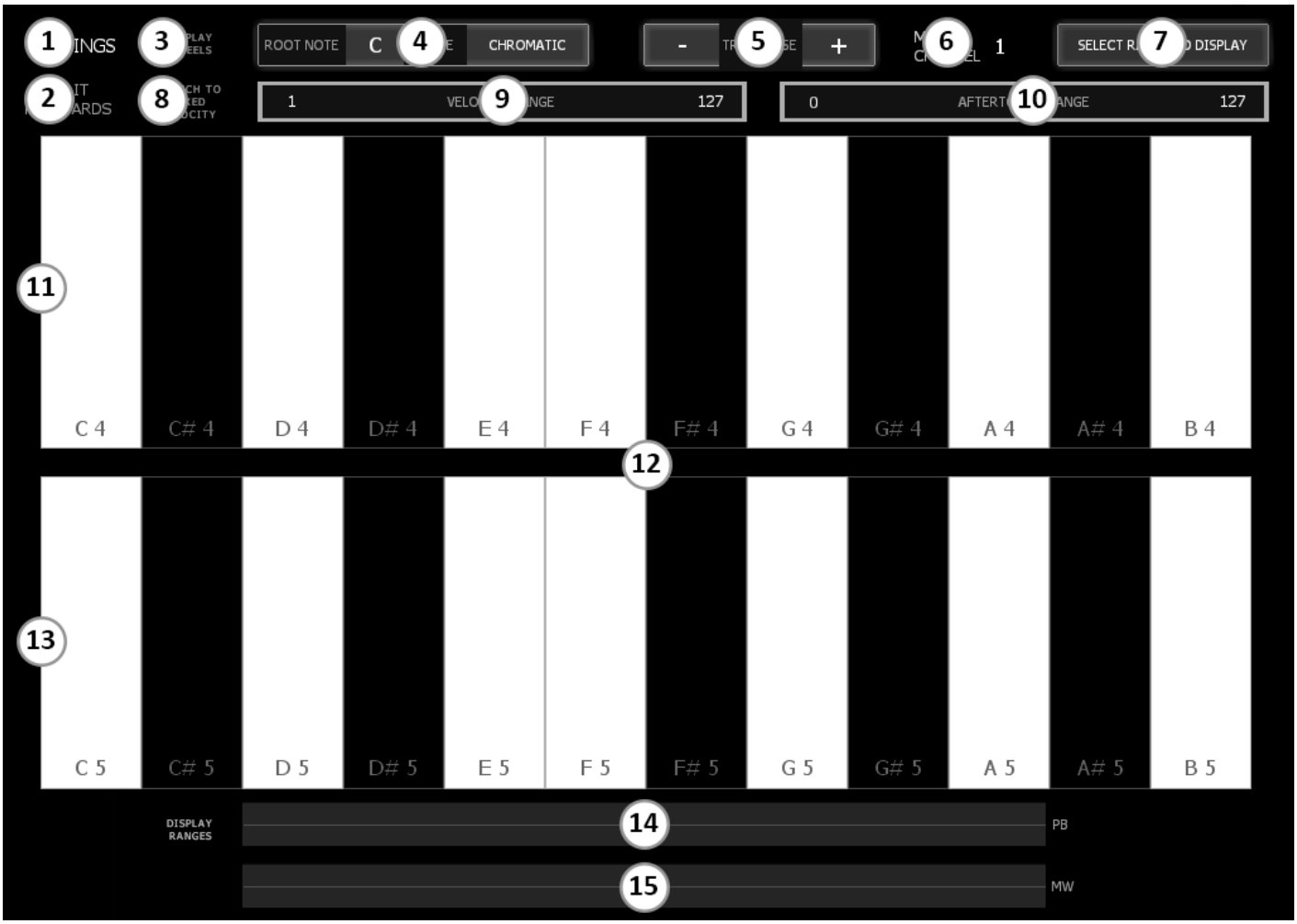
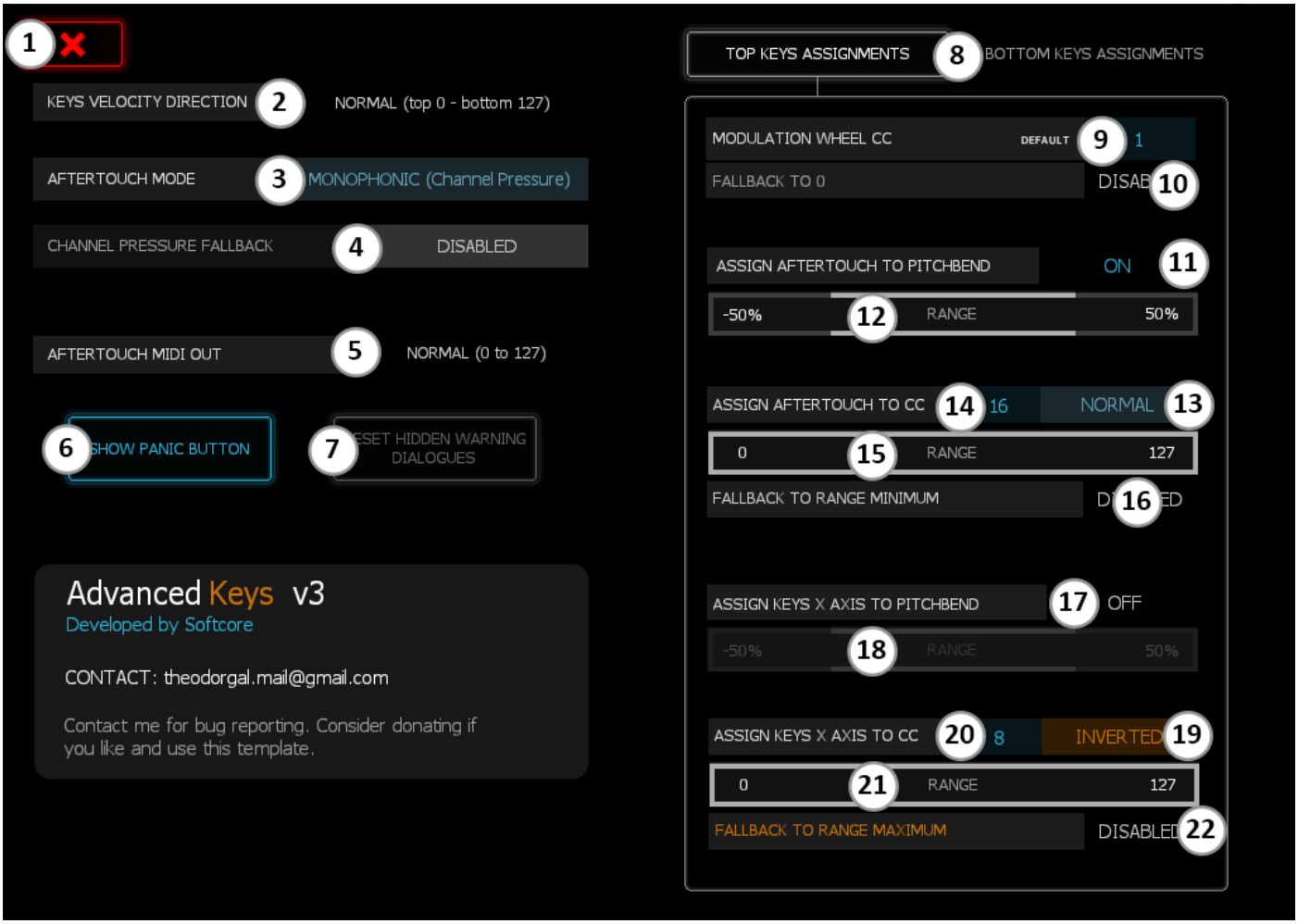
OVERVIEW

Advanced keys v3 is a Lemur template consisting of two rows of piano keys which are able to send velocity and aftertouch midi messages. In simple words, a player can hit a key higher or lower to produce different velocity values, and then move their finger upwards OR downwards to produce aftertouch values.
The keys act as 2-dimensional midi controllers as, besides velocity and aftertouch which are dependent on the vertical position (**Y** axis) of your fingers, they can also send midi messages when you move your fingers horizontally (**X** axis).

An overview of the controls and options are shown below



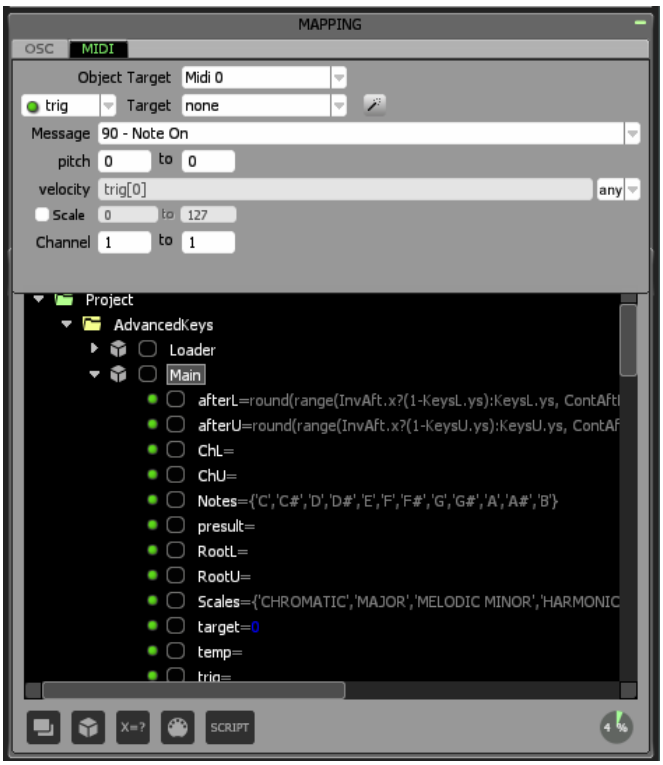
1. Settings button – switches to settings page
2. Keys Mode – switches to Split or Chained keyboards
3. Display pitchbend and modulation wheel
4. Scale and Root note selection pop up
5. Keys transpose down or up
6. Midi channel selection pop up
7. Range display selection pop up
8. Velocity mode selection
9. Velocity range slider
10. Aftertouch or assignment range slider
11. Top row keys
12. Panic button
13. Bottom row keys
14. Pitchbend wheel
15. Modulation wheel



1. Close settings
2. Velocity values direction
3. Aftertouch on-off and mode
4. Channel pressure on-off and value
5. Aftertouch values direction
6. Show – hide "panic" button
7. Unhide hidden warning pop ups
8. Keys row selection (top, bottom – single if chained)
9. Modulation wheel CC number selection (tap and drag up or down to set)
10. Modulation wheel return to 0 on-off
11. Assign aftertouch to pitchbend on-off
12. Aftertouch to pitchbend range slider
13. Assign aftertouch to CC on-off and mode
14. Aftertouch to CC number selection (tap and drag up or down to set)
15. Aftertouch to CC value range slider
16. Assigned CC value return to range minimum/maximum on-off
17. Assign keys X axis to pitchbend on-off
18. X axis to pitchbend range slider
19. Assign X axis to CC on-off and mode
20. X axis to CC number selection (tap and drag up or down to set)
21. X axis to CC value range slider
22. Assigned CC value return to range minimum/maximum

SETTING UP

By default, the template is midi mapped to Lemur target 0. To set up a different Lemur target load the template in the editor and follow the steps below.



First, select container "Main" as shown in the image and set the option "Object Target" to your desired Lemur target.
CAUTION: Do not set the "Target" option (leave it to "none").

Secondly, select the expression "target" (shown in image, in the list, with blue value 0) and change the 0 value to your desired Lemur target.

Obviously, this setting must be the same for both the steps above.

That's it, you're done.

Note: Whenever the template is loaded, some note-on messages are being sent as Lemur loads initial values for pitches. If you have already set up a midi connection with an instrument this will result in your instrument playing those notes. Unfortunately, this cannot be avoided so in case of live performance make sure the template is loaded before any instrument is audible to the audience or midi connected to Lemur.

USING THE TEMPLATE

Keys' rows configuration (Split keyboards – Chained Keyboard)

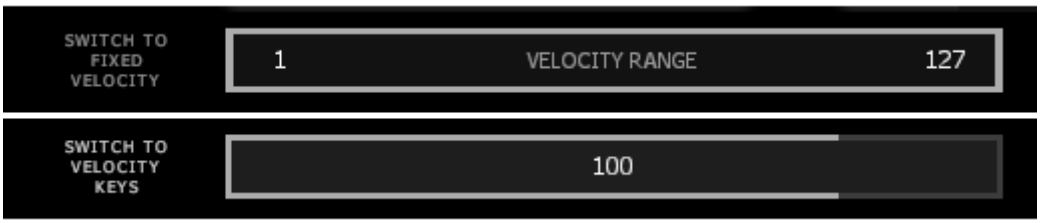


The keys can be used either as two completely independent keyboards of 12 keys, each with its own settings or as a 24-keys single keyboard with common settings for the two rows. This way, you can choose to play two different midi mapped instruments at once, by utilizing different midi channels for the top and bottom rows or play one midi mapped instrument with a two-octaves keyboard.

Basic Options

These options are immediately available in the form of "bars" above and below the keys' rows. When the "Chained Keyboard" is selected only the top bar is displayed as the options are then common for both the top and bottom rows of keys.

Velocity Range and Options



By default, the keys send out velocity midi messages according to the height they are touched (key Y axis). This means that you can play the keys and control an instrument parameter according to how high or low you touched the piano key. In this configuration (velocity keys), you can specify the range of values that are sent out. By default, the lowest value is sent when the keys are touched in their top edge and the highest value when the keys are tapped on their bottom edge (this can be changed in the "settings" page). For example, a range of "25 -100" means that the lowest possible value of velocity will be 25 and the highest, 100.

Sometimes however, you might wish to skip this option and play with a fixed, selected velocity. In this configuration (fixed velocity), you can specify the fixed velocity value. In any case, you should remember that velocity is calculated in relation to the Y axis of the key when that key is touched.

Notes:

a) Having playability in mind, there is a sensible "area" on the key that is considered "top" or "low" edge. Practically what this means is that you don't have to hit exactly the edge of the key to reach highest or lowest value but rather just close enough to it.

b) velocity value 0 is excluded from the options, as generally a note-on with velocity 0

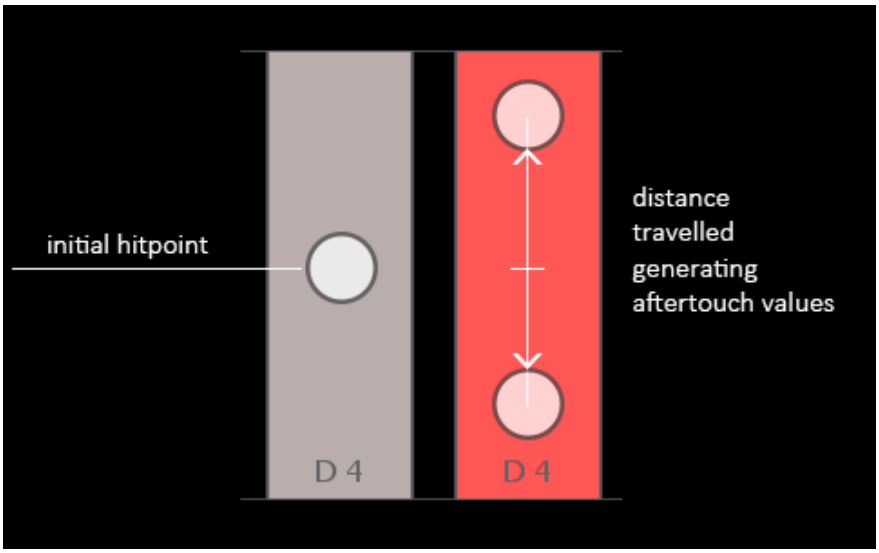
midi message is considered by all instruments as a note-off message
c) The keys also support note-off velocity messages and in this case the note-off velocity is generated by the Y axis of the key when your finger lets go of the key. The truth is, I have never used an instrument supporting note-off velocity but nevertheless, the feature does exist in the template.

Aftertouch Range



By default, each key after it has been touched, generates an **aftertouch** value **in relation to the distance travelled by your finger from the initial hit point in the Y axis**. So, you can hit a key on its top edge, generating a low velocity value then move your finger downwards to generate aftertouch values or hit a key on its bottom edge, generate a high velocity value then move your finger upwards to generate aftertouch values. This design choice was made with playability in mind: you can choose to have low or high velocity values but the initial aftertouch value will always be the same.

This initial minimum (or maximum) aftertouch value as well as the highest (or lowest) possible value are set with the "aftertouch range" slider (these can be changed in the "settings" page).



The keys also change to a red-ish color to provide visual feedback of the aftertouch values generated. In the image, a key pressed, and the same key when aftertouch has been generated.

In any case, remember that aftertouch values are generated from the **distance travelled** by the finger in the Y axis, and **NOT by the position** of the finger in the Y axis (as is the case with the velocity values).

Note: When you have made assignments of aftertouch or Key X Axis to pitch-bend or CC control in the "settings" page, the "aftertouch range" slider can be hidden in favor of displaying the assignment's range slider, thus providing a fast way to tailor the assigned value range according to the playing style. (more details in the "settings" chapter)

Midi channel selection



The keys can be configured to send midi messages to specific midi channels. In "split keyboards" configuration, the two rows can have independent midi channel settings. This can be used to play 2 instruments at the same time by configuring the instruments to receive midi from this specific midi channel. In the case of "Chained Keyboard" the midi channel selection is common for both the rows.

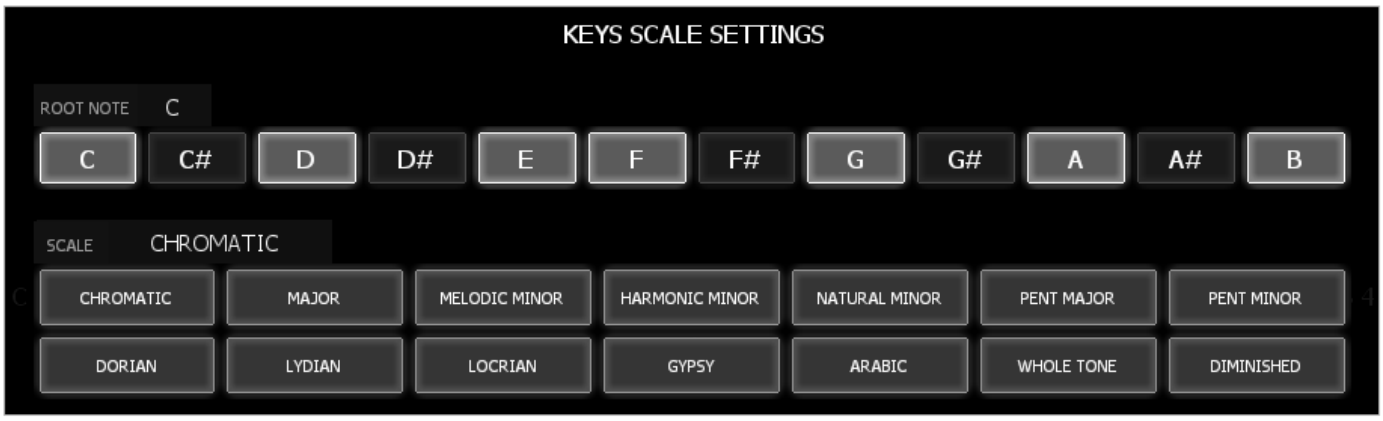
Keys' pitch transposition



Each row features 12 keys which represent a 12-tone scale that can be transposed up or down by 12 tones with the "-" and "+" buttons. When "Chained Keyboard" is selected, both rows are transposed with one set of buttons.

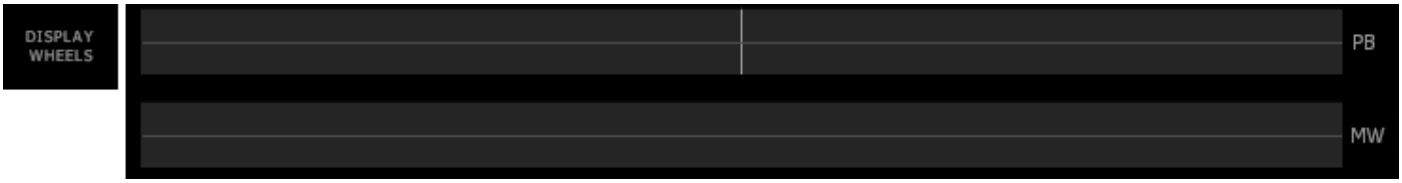
Scale and Root note selection





By tapping on the button displayed at the top of the image, a pop-up opens where you can select a scale and root note to be played. Upon doing so, the keys display only those tones that belong to the scale and root note selected. When "Chained Keyboard" is selected, both rows change with one set of controls. Keep in mind, that depending on the scale and root note selected in "Chained Keyboard" configuration, the bottom row may or may NOT begin with the root note as it has to follow up the last note of the top row. To close the pop up simply tap on the button again. This button always displays the current configuration.

Modulation and Pitch bend wheels



By tapping on the "display wheels" button, modulation and pitch-bend wheels are displayed. They are displayed horizontally and not vertically as in a physical keyboard which might seem counter-intuitive but this design was preferred to save screen space for the keys.
The modulation wheel can be configured in the "settings" page to send any CC message essentially being transformed in a fader with mappable CC number. The Pitch-bend wheel can be controlled by aftertouch, also configurable in the "settings" page.
When "Chained Keyboard" is selected, the two rows share common wheels which are displayed on the bottom of the template.

SETTINGS

Basic Settings

Keys velocity direction

By default, velocity generated by the keys' tap is from "top" to "bottom" meaning, the higher you tap the key, the lower the velocity (and vice versa). You can change this behavior with this option resulting in higher velocity values the higher you tap the keys (inverted).

Aftertouch mode

The midi protocol specifies two kinds of aftertouch, channel pressure and key pressure. Channel pressure, which is the most common and most used (by physical keyboards) specification, provides a value for the whole midi channel the keys are transmitting on. In simple words you get one value regardless of what or how many keys you press which you then assign to a parameter of your instrument.
The template though, also provides the option to send "key pressure" or "true aftertouch" as some manufacturers call it. In this specification each key pressed, sends its own aftertouch value. I have never had any instrument supporting this option but nevertheless the template supports it.
note: in the case of "channel pressure" the single aftertouch value generated is calculated as the average aftertouch of keys pressed. This design avoids sudden "jumps" of the transmitted value when you move your fingers across the pressed keys Y axis.

Channel pressure fallback

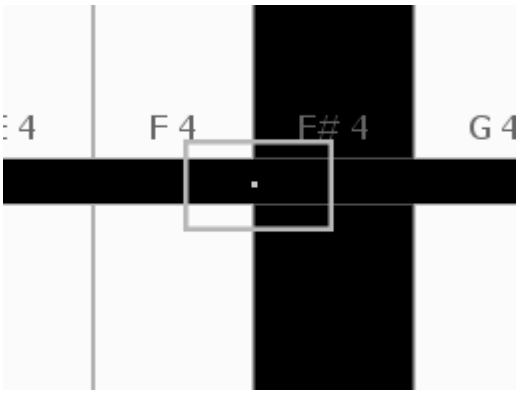
This option specifies what the aftertouch value will do when the player lets go of all the keys and is applicable only to "channel pressure" aftertouch mode. (in "true aftertouch" mode, the aftertouch value stops being transmitted when the key is depressed).
DISABLED: the value stops transmitting as soon as all the keys are released, so essentially it stays at the last value that was transmitted when the keys were pressed (this is the same as "true aftertouch" behavior)
0: the channel pressure value falls to 0 when all keys are released
127: the value goes to 127 when all keys are released
To range minimum: the value falls to the minimum value specified by the "aftertouch range" slider when all keys are released
To range maximum: the value goes to the maximum value specified by the "aftertouch range" slider when all keys are released

Note: what option is best, is strictly determined by the actual instrument parameter that is assigned to aftertouch values. The best way to utilize this feature is to just play an instrument, assign aftertouch to one of its parameters and use your ear to determine which option provides the desired result.

Aftertouch midi out

By default, aftertouch values start from 0 (or the minimum value defined by the "aftertouch range" slider) and rise to 127 (or the maximum value defined by the "aftertouch range" slider) when you move your finger away from the initial hitpoint. Depending on the instrument parameter mapped to aftertouch you might want these values inverted, that is, starting from 127 (or maximum value) and fall to 0 (or minimum value) when you move your finger away from the initial hitpoint. Again, this option exists to serve specific needs and is aesthetically determined by the actual instrument parameter that is assigned to aftertouch values.

Show panic button

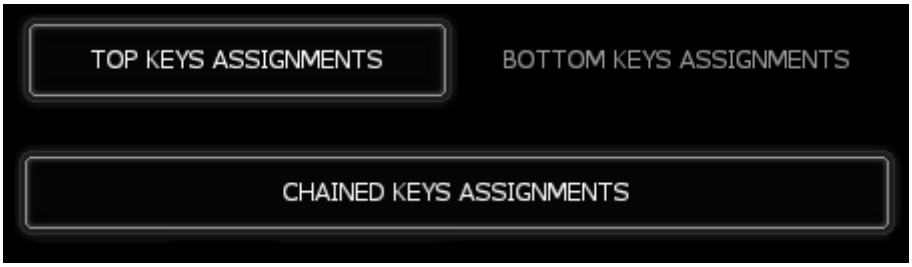


By default, a "panic" button is placed in the middle of the screen between the two keyboards (indicated by a small grey dot). This can be tapped when things have gone wrong and your instrument is producing "hang notes" (is "stuck" and continuously plays a note). On tapping it, note off messages in all the pitches are sent to the instrument. You can choose to hide this button if it interferes with your playing the keys.

Reset hidden warning dialogues

By default, when you make specific settings to the top and bottom keys in "split keyboards" configuration, some warning pop up dialogues may appear to inform you about settings that don't really make much sense (i.e., when the resulting top and bottom keyboards are actually set in a way that makes then identical). In these warning dialogues there is an option to "never show again". This button, resets the dialogues that have been set to never appear again.

Assignments



With this set of options, various aspects of the template can be assigned to midi out values, expanding the ways you can interact with your midi-controlled instrument. When "Split Keyboards" are configured, the top and bottom keyboards have their own independent assignments. When "Chained Keyboard" is selected the controls become common for both rows and the bottom row inherits the current settings of the top row. Further adjustments are then applied to both rows.



Due to the nature of the assignments, most of the times their various ranges are best to be tried while playing. For this reason, when any assignment is active, a "select range to display" button is enabled in the keys page. Tapping on this button reveals a pop-up where you can select any enabled assignment's range for this row of keys to display. In "Chained keyboard" mode of course, only one such button is displayed as the ranges are common for both top and bottom keys' rows.

Modulation Wheel CC

In physical keyboards, the modulation wheel is "tied" to CC number 1. In fact, all instruments respond to this CC number without having to set it anywhere and simply call it "modulation wheel". However, with this option you can assign the modulation wheel to a different CC number essentially making it a midi-mappable fader. Notice that in this case

you probably have to configure your instrument to "receive" that CC number and assign it to one of its parameters.



To change the CC number of the modulation wheel, tap on the number displayed and drag your finger up or down.

Fallback to 0: When enabled, the modulation wheel returns to zero as soon as you let it go.

Assign aftertouch to pitchbend

With this option enabled, generated aftertouch values cause the pitch-bend wheel to move thus sending midi pitch bend messages out. This is a feature that can provide vibrato with the movement of your fingers on the Y axis of the keys, always centered to 0 when you first tap on the keys. Moving the fingers upwards causes a rise of the pitch-bend wheel and moving the fingers downwards causes a fall.

Range: You can specify the range by which the pitchbend wheel is affected with the dedicated slider.
note: you can set the wheel to be displayed in the keys page to check visually the assignment and how exactly aftertouch is affecting the wheel.

Assign aftertouch to CC

With this option, you can assign generated aftertouch values to a CC number, essentially making the keys a custom midi CC controller. The generated value is calculated as the average aftertouch of the keys pressed. This option is particularly useful when you are dealing with an instrument's parameter with aftertouch indirectly by assigning a CC number in the option, and then assign that CC number inside your instrument options to one of its parameters.



To set the CC number, tap on the number displayed and drag your finger up or down.

NORMAL: When set to normal mode, the CC value will rise from 0 (or range minimum) to maximum (or range maximum) according to how far you move your finger.

INVERTED: When set to "inverted" the CC value will fall from 127 (or range maximum) to 0 (or range minimum) according to how far you move your finger.

Range: Use this slider to define the range of the transmitted CC value

Fallback to Range Minimum/Maximum: With this option enabled the CC value assigned will drop to range minimum ("normal" mode selected), or rise to range maximum ("inverted" mode selected) when all keys are released.

Assign keys X axis to pitchbend

With this option enabled, you can assign your finger's position on the X axis of the keys to pitchbend. This is a feature that can provide vibrato with the movement of your fingers on

the X axis of the keys (horizontally), although the initial tap must be very close to the center of the key to avoid an initially detuned note. Moving the fingers to the right causes a rise of the pitch-bend wheel and moving the fingers to the left causes a fall.

Range: You can specify the range by which the pitchbend wheel is affected with the dedicated slider.
note: you can set the wheel to be displayed in the keys page to check visually the assignment.

Assign keys X axis to CC

With this option, you can assign generated aftertouch values to a CC number. The generated value is calculated as the average position of the fingers in the X axis of the keys pressed.



To set the CC number, tap on the number displayed and drag your finger up or down.

NORMAL: When set to normal mode, the CC value will rise from 0 (or range minimum) to maximum (or range maximum) according to how far you move your finger from the horizontal center of the key.

INVERTED: When set to "inverted" the CC value will fall from 127 (or range maximum) to 0 (or range minimum) according to how far you move your finger from the horizontal center of the key.

Range: Use this slider to specify the range of the transmitted CC value.

Fallback to Range Minimum/Maximum: With this option enabled the CC value assigned will drop to range minimum when "normal" mode is selected, or rise to range maximum when "inverted" mode is selected.

FINAL NOTES

Template usage

Surely, the various options, especially in the Settings and Assignments may look a bit intimidating or chaotic, maybe making you wonder what all these options do. The most important tip I can provide is to first of all make yourself comfortable with the concept of aftertouch by connecting a midi compatible instrument and assign the aftertouch output to an obvious and audible parameter such as, for example a filter frequency cut off of a synthesizer and play a long, sustained note making sure you move your finger up or down on the key you have pressed.

All the options in their default value (what the template came with) are suited for most usage case scenarios. The ranges will help you tailor the parameter's values so that you get the sound you are after with the amount of finger-moving you are after. The "fallback" options are there in case you need "sudden" changes to parameters once you release the keys.

Assigning aftertouch to CC is mainly provided for instruments that do not support aftertouch and assigning aftertouch to pitch-bend aims to provide a more expressive playing that incorporates vibrato.

Finally, although there are options for assigning the X axis to CC or pitchbend due to the fact that the keys are narrower than they are tall, and the fact that in the X axis an absolute distance from the center of the key is calculated (as opposed to aftertouch which is related to the initial hitpoint), its usage may provide unstable results sound wise. I just thought it would be cool to have piano keys that are 2-dimensional controllers so that's why I incorporated the function – nevertheless try it and see for yourself.

Contact info – Donations

I am Theodor Galanis, I have been using Lemur for the last 7-8 years as "Softcore" and I have designed lots of templates for personal use and as Lemur User Library templates.

You can check out some older templates of mine on Liine's User Library and on YouTube

For any suggestions or bug reports, feel free to contact me at:
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If you like and use this or any of my other templates, now is the time to help.
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