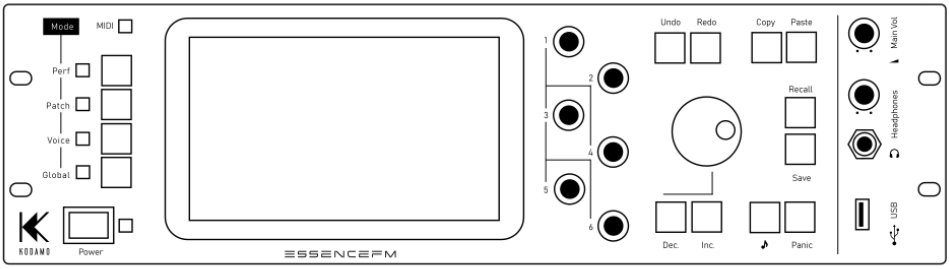
KODAMO

ESSENCEFM

mk1 / mk11



User Manual

FIRMWARE V4.2

English

Welcome to the Kodamo EssenceFM! Thank you for purchasing this instrument, which represents our vision of FM synthesis: a fun, enjoyable experience focused on sound exploration, with minimum complexity. We made the EssenceFM as much "musician oriented" as possible, aiming for reliability and comfort of use in every situation.
This manual was written to offer you the best experience you'd get from it.
We recommend to read at least the first section and store this handbook preciously in case you want to get further information.

Main features

- 6 operator FM engine with free algorithms and resonant filters
- 300 voice polyphony, 300 voice multitimbral (through 16 MIDI parts)
- Flexible 6 point linear/exponential envelopes with loop points
- 8 cord Modulation matrix with 139 sources/224 destinations
- 24 user-editable waveforms
- 2 independent multi-effect DSPs
- Powerful 128 event/128 step voice sequencer
- 8 balanced audio outputs with galvanic isolation

Safety Precautions

- Do not cover the vent holes.
- Do not open the device.
- Do not expose the device to water or any kind of liquid. If this happens, immediately unplug it, then put it in a warm place. Try turning it on again only when it's completely dried.
- Do not use the device in excessively hot environments (>40°C).
- Do not put heavy objects on the device or too much pressure on the touch screen, it could be easily damaged.
- Ensure the device is in a stable position before using it.
- Never power off the device when you are saving.

Please regularly save your data to a USB drive (see Global > Storage). Like on most synthesizers, a power loss occurring while saving may corrupt your sounds.

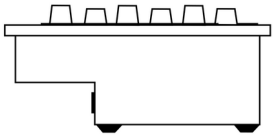
Table of Contents

Setup

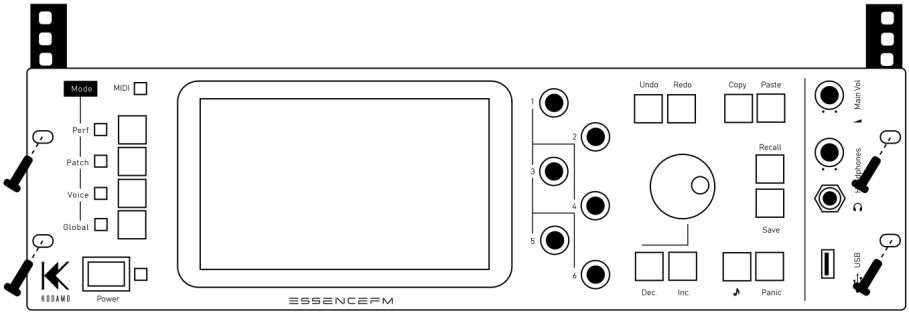
The EssenceFM can be used in different positions.

EssenceFM

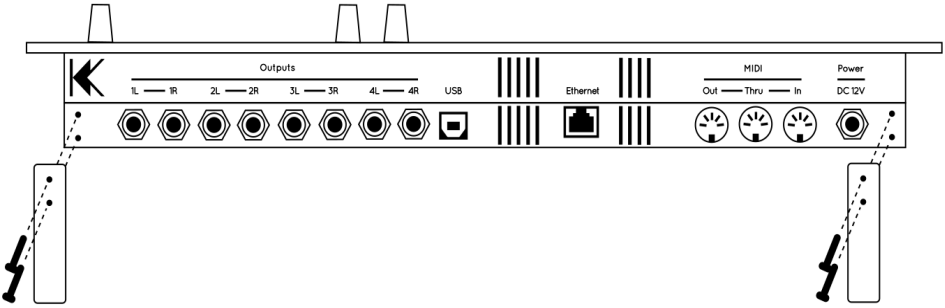
- Horizontal: Let your EssenceFM sit on its rubber feet



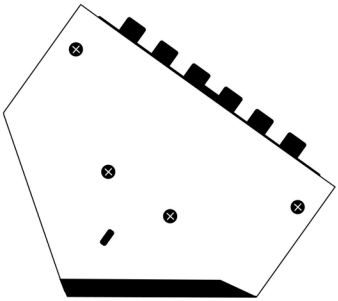
- Rack mount: Secure your EssenceFM in a rack using M6 screws (not included)



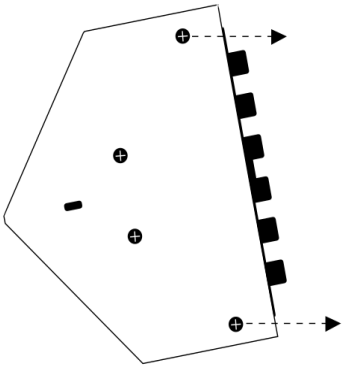
- Tilted/Tabletop: screw the included brackets to the back of your EssenceFM using 4x M3 screws (included). You may have different bracket sizes provided, choose the set that provides the best angle for your use.



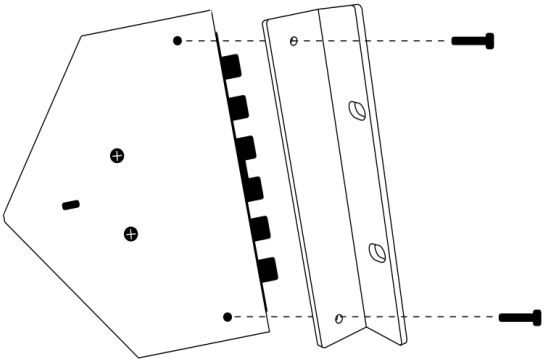
- Tilted/Tabletop: Let your EssenceFM sit at an angle on its rubber feet



- Rack mount:
  1) Unscrew these two screws on each side (4 screws total).
  2) Attach the rack ears on each side using the included 12mm M3 screws:



(1)

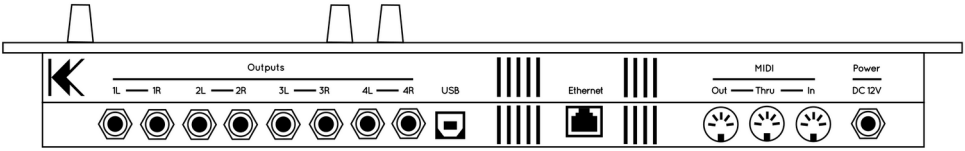


(2)

Your EssenceFM is now ready to be put into a rack.
Put the removed screws in the provided plastic bag to avoid losing them.

Making connections

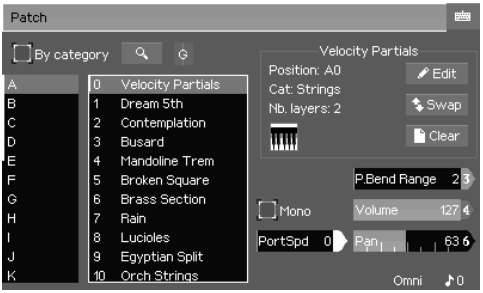
It's the moment to plug your EssenceFM.



Back panel connectors are described below, from the left to the right:

- Audio Output Pairs 1 to 4 (¼ inch / 6,35 mm TRS phone jacks): Each pair can operate as a stereo output (see Effects and Routing section). Each output delivers a balanced signal, but still can be connected to an unbalanced TS jack.
- USB (Type B): Connects to a host system for USB-MIDI transmission.
- Ethernet (RJ45): Connects to a network to carry MIDI-RTP packets.
- MIDI Out (DIN): Connects to any MIDI instrument to be controlled by the EssenceFM.
- MIDI Thru (DIN): Outputs (repeats) any MIDI data fed into the MIDI In port.
- MIDI In (DIN): Connects to any MIDI controlling device (eg. master keyboard, synth, sequencer, computer MIDI interface, wind controller, etc.)
- DC Power supply: Connects to the supplied DC 12V power adapter.

Let's play!

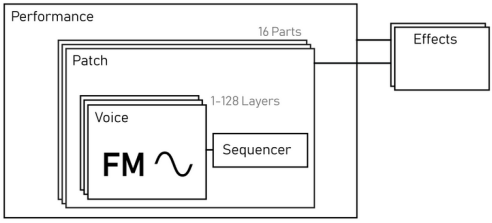


When powered up, the EssenceFM starts in Patch mode by default, letting you play with its preset patches.

Scroll down the list and select a patch by pressing on its name to try it.

There are also Voice presets, which are simpler 6-OP sounds, they can be accessed by going into Voice mode (see next section).

The EssenceFM power resides into its structure, smaller elements are stacked to make big ensembles. Let's familiarize with it.



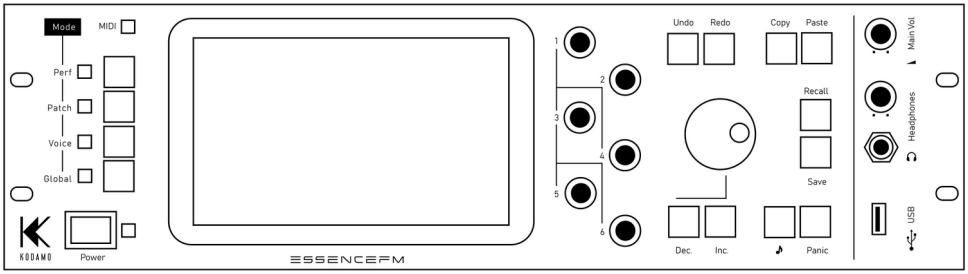
Voice: A Voice is the smallest element that the EssenceFM uses: a 6-op FM sound.

Patch: A Patch is gathering one or more voice(s), by stacking, layering, sequencing them together and adding effects.

Performance: A Performance assigns a patch to each MIDI channel, store effects, routing settings and much more. It allows multitimbral operation. In this mode the effects are shared, ignoring patch effect settings.

Introducing the Front Panel

The EssenceFM front panel is based on the combination of a large touchscreen and hardware controls. Hardware controls provide a quick access to the most common features.



MODE KEYS These keys provide direct access to the associated modes.

- **Performance**
- **Patch**
- **Voice**
- **Global**

A Performance contains Patches, and Patches contain Voices. All elements can be edited directly in their mode (eg. Voice for voices) or from their parent mode. Check the respective sections to learn more about them.

Mode LEDs

An LED near each mode key tells the current active mode. When the Global mode is entered, the previous mode LED (Performance, Patch or Voice) still lights up since those modes keeps running in background. You can think of the Global mode as a virtual mode,

not affecting the sound or the behavior of the synth, only providing access to global parameters.

Data Entry

- **Direct Access knobs:** Those 6 knobs are used for the Direct Access feature described below, except on the main page of the Performance mode, where they act as real-time MIDI controllers.
- **Main Dial**: Modifies the focused element on screen (which will be detailed in the next section).
- **Inc / Dec:** Works in the same way as Main Dial (increments and decrements value).

Edition Keys

Copy: Copies the focused element into the clipboard for further use.

Paste: Puts the clipboard contents into the focused element.

Undo: Discards the last operation, up to 1000 times. Leaving a page resets the undo/redo history. Most operations are undoable: Voice parameters, algorithm arrangements, patch parameters, waveform editing... Only the operations on general pages are usually not undoable (clearing an item, swapping an item, doing a copy-paste operation in the voice/patch/performance/tunings/waveform list...).

Redo: Restores the previously discarded operation.

Save: Saves the current element to internal memory. Apart from some global settings, an element is never automatically saved when edited, moved, overwritten or imported. Pressing Save on a general page (eg. Patch list) will open a popup allowing you to save specific elements or to save them all. Pressing Save a second time will save all the modified elements, exactly like if you pressed “Save All”.

To do a “Save As” action, keep the Save button pressed until the save slot selection popup appears.

Recall: Reloads the current element from its last saved state. This action doesn't clear the Undo/Redo history so you can undo a recall operation (allowing for a sound comparison).

Help Keys

Preview (♪): Plays a few notes to quickly listen to a sound without having to use a MIDI controller. To customize the preview notes, see Global > MIDI > Preview.

Panic: Cuts all currently playing notes and effects including reverb tails.

User Interface Elements

The EssenceFM user interface is organized into pages.

A breadcrumb located at the top of the screen always shows were you are in the page tree.
After pressing a mode key, the main page of the mode is displayed at the leftmost, then you can access more sub-pages from it.
You can navigate back at any time by pressing on a page name.

Note the asterisks (*) on some pages. That means this element was modified but not saved. When the asterisk is on a general page (like the Patch list, Voice list, Performance list), it means there is one or more modified/unsaved elements.

If you are not familiar with computers and user interfaces, here is a description of the elements found in the EssenceFM:

Focus notion: Focus is the graphical representation of which element is currently editable, it's represented by a pink outline surrounding the element. A focused element is directly editable by turning the Main Dial knob, pushing INC/DEC keys, and is eligible to a COPY/PASTE operation.

Direct Access feature: The 6 knobs located on the right side of the touchscreen allow you to edit values without the need to focus the element. Elements concerned by Direct Access are always flagged with the associated knob number, like on the picture above ("1" and "2" flags). All sliders and envelope points can be edited this way (see Envelope Editor chapter).

Popup: A window that appears in front of the page. Often for confirmation purposes, or to show more parameters after pressing a button.

Button: Pressing it triggers an action, like a physical button does.

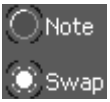
Slider: Allows to set a value. Simply drag the slider horizontally to change its value. You can also enter a numerical value by using the virtual keypad that shows up at the top right corner of the screen.

List: Allows you to select an element in a list. You can swipe it vertically to quickly scroll across the elements, or slowly move your fingertip to reach precisely what you are seeking. Any element can also be accessed by entering its index with the virtual numerical keypad (by pressing on the keypad button after it's focused, like the slider).

Text field: Allows you to enter text data (eg. patch name). Pressing it opens the alphanumeric virtual keyboard.

Checkbox: Controls a parameter that can be activated (checked) or deactivated (unchecked).

Radio Button: Allows to make a choice between several options. Unlike checkboxes, radio buttons are at least two, and only one can be selected at a time into a set.



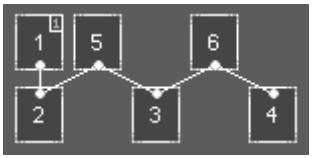
Tab field: Splits interface elements into several tabs, which are like small pages. Press on its header to access its contents. The current active tab has a lighter color and is offset compared to the others.

First steps

Introducing FM synthesis

FM stands for “Frequency Modulation”. A waveform is multiplied (“modulated”) with another one to create a new sound. It’s the same as vibrato, except that it is much faster, so much that it sounds like a different timbre to the ear, rather than a quick vibrato.
If you’re familiar with subtractive synthesis used in analog synths, FM is quite the opposite: you usually start from sounds with low harmonic content (eg. a Sine Wave), then modulate it to create more harmonics.
The new harmonics, sometimes called “Partials”, depends on the frequency ratio between the carrier (the base sound) and the modulator (the one modulating the carrier’s signal).

In FM synthesis, a block generating sound is usually called an Operator instead of an Oscillator but they are the same thing. The Operator arrangement is called an Algorithm.
An FM Algorithm is usually represented as below, and is to be read from top to bottom.



When an operator is feeding its signal into another one under it (1, 5 and 6) it is called a *Modulator* -you don’t hear its direct sound-, while operators at the bottommost (2, 3 and 4) are *Carriers*.
Changing the volume of a carrier will effectively change your sound’s volume, but doing the same thing on a modulator with modify the harmonic content of the sound. This is where the power of FM synthesis resides! Coupled with envelope generators, harmonic content that changes over time is easily achieved.
There may be several modulators for one carrier, in this case their output is simply summed before the modulation happens (additive synthesis). Or there may be a modulator modulating several carriers, in that case its output is simply sent to each carrier.
The operator 1 has a small number on its top right corner indicating its feedback source. A feedback is simply another link between two operators, except that it can feed into itself (which is the case on the picture above). This is used to alter the tone of the operator, providing more and more overtones as the feedback level is increased. It can be

used as a noise source when pushed to the max.

The quickest way to learn FM synthesis is by looking at existing sounds. Go into Voice mode, then press “Edit” on different voices to see how they work. Try modifying them to see how the tone is affected. You can try anything without worrying breaking something provided you don’t press Save. Simply press Recall or restart the unit to get it back to its original state.

FM synthesis has the big advantage of being really fun to work with - after about 10 years experimenting with it, we are still surprised by the variety of sounds we can get from it. We hope you’ll like it as much as we do!

Sound design tips

Start with a single audible operator (mute the others), then build your sound from that point, by adding operators as you need them. Instead of using a single modulator with a very high volume, try using several of them chained in different ways, with a lower volume to achieve a more refined sound.

When trying to achieve a particular sound, try to split it into several sub-sounds to make them easier to manage. For example, for a pan flute, you may want to create a short noise attack and a sustained square-like tone.

Use the sine wave first. They are the most flexible and useful in FM synthesis. Use other waveforms with care, as their aliasing limit is easily exceeded. You will find that some waveforms are well suited to some instruments (like the Square wave for cymbals, or the HSine for bowed strings).

When you have a good sound that is just a bit “thin” sounding try detuning an operator (“Fine” parameter) to create a rotating phase shift. If the wobbly effect isn’t appropriate, try overlapping two instances of the voice in Patch mode instead, with a slight detune to one of them.

The EssenceFM offers you 300 voice polyphony to allows for heavy layering in Patches. Don’t stay with single 6-op voices, build you final sounds using multiple voices controlled by the voice sequencer. You’ll get the richest FM sounds ever!

Basic workflow

To make the sound creation process easy, we suggest to always start by creating a Patch (either in Patch mode or in Performance mode).
Then when you are in the Patch editor, assign the first layer to an empty voice then press on the Edit button to edit this voice directly. That allows you to start with a simple sound that can be improved afterwards, with other layers, effects and more.

The same results can be achieved by starting in Voice mode but once you created your voice you need to go into Patch/Performance modes and create a new patch if you want to use the layers, splits, effects and sequencer.

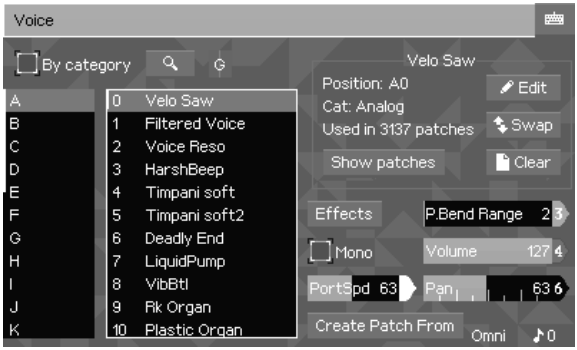
Ideas/Suggestions

- Try loading DX7 sound banks. Some sounds will sound close to the originals, some wildly different, giving you new ideas.
- There is only 1 real LFO per voice, but you can simulate more of them by using envelope loops. You can also sacrifice an operator by setting its volume to zero and use its envelopes as dedicated modulation sources for LFOs or other purposes within the modulation matrix.
- Envelopes can simulate echo/delays.
- Looped pitch envelopes can simulate three-note arpeggios.
- You can layer Patches (which are already layered voices) in Performance mode, by assigning different parts to the same MIDI channel.
- The massive layering ability of the EssenceFM is perfect if you want to try creating sounds using additive synthesis.
- The Recall button can be used as a Compare button. After pressing Recall to listen to your original sound, press Undo to get back to the last edition.
- Do not be worried about sending tons of notes and program changes to the EssenceFM. It supports thousands of program changes per second with zero delay, and many hundred of notes without reaching the CPU limits.

Voice mode

In Voice mode you can organize, play and edit a 6-op FM voice. This mode responds to the Global Channel, see Global > MIDI configuration.

Voice List



Bank / Voice Lists: Those lists allows you to select the voice you want to play or edit in this mode

By Category: Shows the voices/patches sorted by Category instead of sorting them by Bank.

Find : Allows to search a voice by name.

MIDI activity indicator : Shows the Pan (light vertical bar), Volume (height), Channel (channel number or G for global channel) and MIDI activity (color) in a very compact way.

Edit: Goes into the Voice Edit Mode

Swap: Swaps the current voice with another one. Pressing this button will open a popup letting you choose the voice to swap with, and has an “Update related patches” checkbox. It's very important to keep it checked if the two voices you are swapping are used by some patches. All patches using them will be modified accordingly and are now in unsaved state (you need to save them afterwards).

Clear: Resets completely the current voice

Show Patches: Shows all patches using the selected voice. It’s useful to see which patches will be affected when editing this voice.

Create Patch From: Creates a patch from the current selected voice, copying its name, category and auto-assigning the voice to the first layer of the patch.

The following parameters aren’t stored within the voice, they are for playing purposes:

Pitch Bend Range (0 ~ 96): Pitch Bend range in semitone

Volume (0 ~ 127): Volume of the voice

Pan (0 ~ 127): Pan of the voice

Mono: Toggles voice to monodic play mode

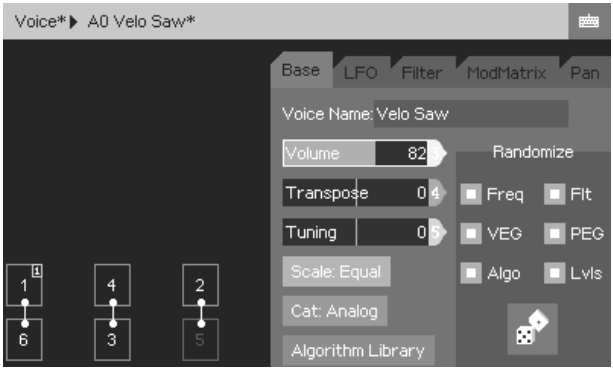
PortSpd (0 ~ 127): Portamento Speed, works only when the voice is in Mono Mode

Effects: Configure the effect DSPs

Status bar: shows the Global Channel (1-16 or Omni) and the current polyphony used.

Voice Editor

The voice editor is split into two parts: the left part of the screen displays the algorithm, while the right panel displays parameters relative to the voice (when no operator is focused) or relative to the focused operator.



Algorithm design

The algorithm on the left side of the screen shows the operators. Their output level is displayed in real-time as you are playing, allowing you to clearly see how their envelopes are working.

There are several actions you can do on the operators via the touch screen to build your algorithm:

- Pressing an operator and releasing it (drag&drop) onto another one will connect them together. If these operators are already linked together, their positions will be swapped.
- Moving an operator always removes its bottom links.
- Releasing an operator in an empty area and it will simply fall, going to the bottom or to the nearest operator below.

- Using two fingers and pressing simultaneously two operators will link them together. It allows to create additional links that aren't always possible with the drag&drop operation.
- Quickly pressing two times on a operator will mute/unmute it (same as pressing the "M" and "S" buttons at the top right corner of the screen)

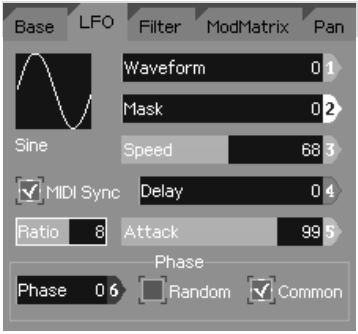
Editing voice and operator parameters

When an operator is pressed, the right panel shows the operator's parameters.
When you press the touchscreen in an empty region of the left part of the screen, the right panel shows the global voice settings.

Voice settings

GENERAL VOICE SETTINGS

Voice Name: Sets the name of the voice.
Volume (0 ~ 127): Sets the volume of the voice.
Transpose (-36 ~ +36): Sets the semitone transposition of the voice.
Tuning (-100 ~ +100): Sets the fine tuning of the voice.
Scale: Selects the scale which will be applied to the voice (cf. Tuning section in Global Mode).
Category: Assigns a category to the voice (cf. Sorting section in Global Mode).
Algorithm Library: Selects from one of our 32 preset algorithms to help you to start creating a new voice.
Randomize: This section allows you to randomize different parameters of the sound: *Freq* for operator frequencies, *Flt* for filter parameters, *VEG* for volume envelope, *PEG* for pitch envelope, *Algo* for the algorithm (selected from the algorithm library), *Lvls* for operator levels.



LFO

Waveform (0 ~ 23): Selects the waveform you want to use with your LFO. It's the same waveform set used into synthesis.

Mask (0 ~ 12): This mask distorts and reshape the selected LFO waveform. It doesn't overwrite the original waveform.

Speed (0 ~ 127): Sets the LFO speed.

Delay (0 ~ 127): Sets the delay between the Note On event and the LFO start.

Attack (0 ~ 127): Sets the attack rate for the LFO.

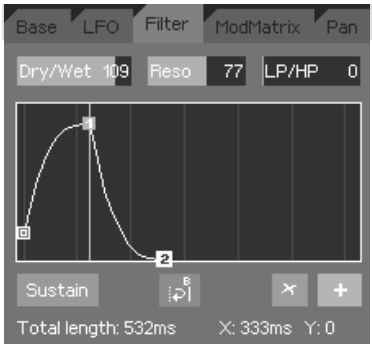
MIDI Sync: When checked, the LFO speed is controlled by the MIDI clock. The Speed parameter is then ignored.

Ratio (0.25 ~ 16) *[only shown when MIDI Sync is checked]*: Selects the speed multiplier (beats) to use with the MIDI clock

Phase Offset (0 ~ 31) *[only shown when Random and Common are unchecked]*: Sets the waveform phase offset where the LFO starts at.

Random Phase: Sets the LFO phase to a random starting point when a note is played.

Common Phase: If checked, all the notes using this voice will share a single instance of the LFO (all notes will have their LFO in sync).



FILTER

Dry/Wet Balance (0 ~ 127): Sets the balance between dry sound and filtered sound. A value of 64 means you've got a 50/50 mix between dry and filtered sound.

Resonance (0 ~ 120): Set the filter resonance. Beware of loud resonant spikes if you push it to the maximum.

LP/HP (0 ~ 127): Fades between Low-pass and High-pass modes

Cutoff Envelope: Controls the cutoff evolution over time. See Envelope Edit section to know more about manipulating envelopes.

MODULATION MATRIX

Up to 8 modulation cords can be setup for each voice. “Set Source”, “Set Dest.” and “x” (delete) buttons apply to the current selected modulation in the list.

Offset: Applies a positive or negative offset to the modulation source.

Ratio: Scales the modulation source.

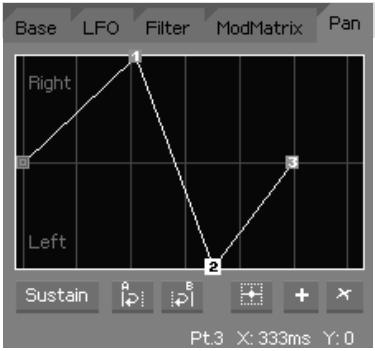
Set Source: Selects the source to use (cf. source list below).

Set Dest.: Selects the destination parameter to affect (cf. destination list).

Cut cord (x): Removes the selected modulation line.

I/O value monitor (at the bottom of the screen): Allows to check, for the selected cord in the list above, the source value and how the Offset and Ratio amounts are affecting it. It’s useful to fine tune your Offset/Ratio values according to what you are sending into the modulation matrix.

Modulation Matrix Sources	Modulation Matrix Destinations	
Note number Velocity Release Velocity Aftertouch Poly. Aftertouch Pitch Bend LFO Note count RNG (random number generator) Envelope (any) Control Change (any) MIDI BPM clock	**Global destinations:** Volume Freq. Coarse/Fine LFO Speed LFO AM/FM Depth LFO Waveform/Mask LFO MIDI Sync Ratio Flt Cutoff/Cutoff+Env Flt Reso/Mode Flt Dry/Wet FltEG Speed FltEG Sg1-5 Time PanEG Speed PanEG Sg1-5 Time PanEG Height Feedback Source/Level Algorithm number	**Per-operator destinations:** Volume Freq. Mult Freq. Coarse Freq. Fine Waveform Initial Phase LFO AM/FM EG Speed EG Sg1-5 Time EG Pt1-6 Y PitchEG Speed PitchEG Sg1-5 Time PitchEG Pt1-6 Y



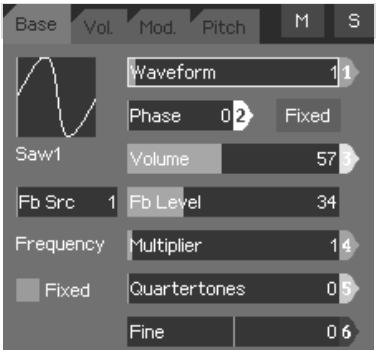
PAN ENVELOPE

This envelope controls the voice panning over time. See Envelope Edit section to know more about manipulating envelopes.

On the EssenceFM, panning is averaged when nested elements have different pannings (eg. a Patch panned to the left using a Voice panned to the right will sound centered).

Operator settings

Pressing on an operator changes the layout of the screen to show its parameters. They're spread on 4 pages: Base, Vol, Mod and Pitch. **M** and **S** buttons are also available to Mute and Solo the current operator. Mute is also doable with a double tap on the operator.



BASE/FREQUENCY SETTINGS

Waveform (0~23): Sets the waveform to use for the selected operator. See Waveforms section in Global mode to know how to edit and customize those waveforms.

Phase (0~31): Sets the initial phase where the waveforms starts at.

Phase (Fixed/Random/FreeRun): Selects the initial phase mode. In fixed mode, it uses the Phase slider value to determine the starting offset. In Random mode, a random phase is chosen on each key press. In FreeRun mode, the phase from previous notes is kept.

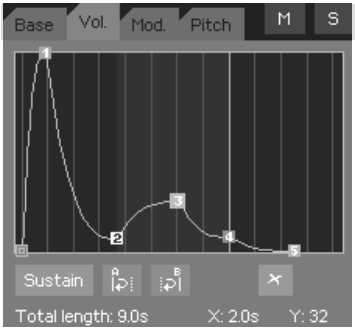
Volume (0~127): Sets the operator's volume.

Feedback Source (1~6) *[OP1 only]:* Selects which operator output will be fed back into OP1.

Feedback Level (0~127) *[OP1 only]*: Sets the level of the feedback loop.

Fixed Frequency Mode: Toggles between Fixed or Multiplicative operator frequency mode. In Multiplicative mode, it follows MIDI note frequencies with multiplier applied to it, while in Fixed mode, it stays always the same.

Multiplier (0~40) *[only in Multiplicative mode]*: Sets the operator frequency multiplier. Original frequency depends on incoming MIDI note pitch.
Quartertones (0~24) *[only in Multiplicative mode]*: This parameter allows you to set the operator frequency by quarter-tone steps.
Fine (-100~+100) *[only in Multiplicative mode]*: This parameter allows you to fine tune the operator's frequency.
Freq. Multiplier *[only in Fixed mode]*: Sets the base multiplier for the fixed frequency. Available values are 0.1, 1, 10 and 100
Freq. Fine (0 ~ 255) *[only in Fixed mode]:* Sets the operator frequency according to the multiplier above.
Frequency indicator *[only in Fixed mode]*: This number shows you the operator actual frequency in Hertz. It's useful to accurate the two previous parameters.

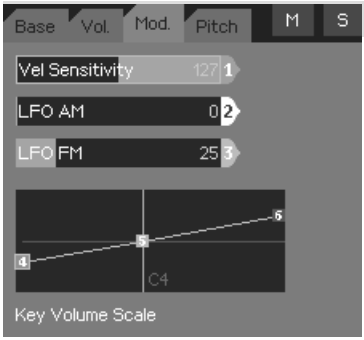


VOLUME ENVELOPE

This envelope allows you to control the operator's volume during time. See Envelope Edit section to know more about envelope manipulation.
If the selected operator is a carrier, you should end its envelope with a value of zero, otherwise the voice will never stop playing. Simply press the panic button if a note is stuck.

Tip: to quickly get the same envelope on different operators simply focus the envelope, press Copy, select another operator then press Paste.
A whole operator can also be copied if you press Copy when the operator is focused.

Note about volume envelopes: on the EssenceFM, oscillators are always running no matter if notes are active or not. Any volume envelope not finishing with a point to zero will let the sound come through, sounding like stuck notes. Check all your operator's envelopes if that happens.
That behavior can be used creatively to make drones (you can still stop them with the Panic button or by changing the MIDI channel volume).



MODULATIONS

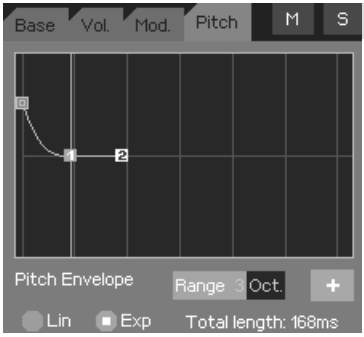
Basic modulation parameters are available here. For more advanced modulations check the Modulation Matrix.

Velocity Sensitivity (-127 ~ +127): Sets how the operator volume is affected by note velocity. A value of zero means the operator's volume is always as defined by the Volume parameter in BASE tab. As you increase its value, low velocities can scale its volume down more and more.

LFO AM: Sets how much the LFO affects the current operator's volume.

LFO FM: Sets how much the LFO affects the current operator's frequency.

Key Vol Scale: This curve allows you to set the operator key scaling. It scales the operator's volume according to the MIDI note number. There are 3 parameters: Lower volume, Center note, and Upper volume. The two (upper and lower) volumes represents the amount at bottom and top of your MIDI keyboard. The center note parameter sets the root of those two curves.



PITCH ENVELOPE

This envelope allows you to control the operator pitch over time. See Envelope Edit section to know more about manipulating envelopes.

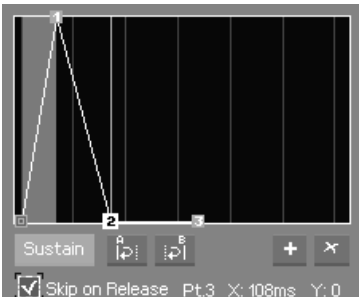
Pitch EG Range (shown when no point is selected): This value sets the Pitch EG maximum value. Available ranges are Tone, Quint and 1 to 4 octaves.

Other parameters: See next section (Envelope Editor)

Tips :

- Pitch envelopes are great for creating sound effects
- Works well for brass attacks and other fast transients in sounds
- You can simulate fast 3-note arpeggios by doing a stair-shape using the 6 points with loop enabled.

Envelope Editor

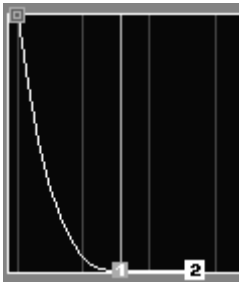


The envelope editor is quite different from those you can find in other synthesizers. Instead of the classic ADSR it's made of points that can be placed freely to create any curve. Each envelope segment is delimited by 2 points, you can drag them to adjust their horizontal and vertical position. There are other ways to adjust point positions:

- Main Jog Wheel and INC/DEC keys for the vertical position
- Knobs for the horizontal position

The horizontal zoom can be adjusted by pinching with two fingers.

Note about the time scale: to allow you to easily create short and long envelope segments without requiring huge amounts of zooming/scrolling, we adopted a logarithmic time scale. A segment that is 2 times shorter than another will play much quicker than what you would expect if the scale was linear.

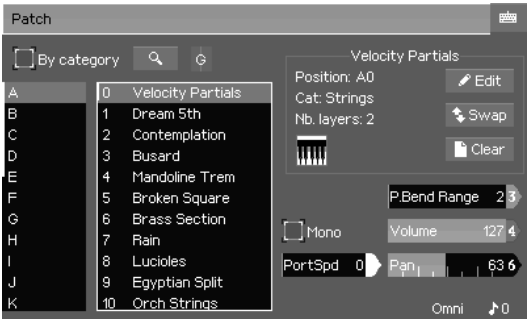


Note about decay reaching Zero and Release time: this case is impossible to represent correctly with a single graphical curve. To compensate for that the EssenceFM uses the last segment as the release length (points 1 and 2 in this picture). That means if your envelope decays to zero and you want to have a release time in case the player release the key quickly, you need to add another segment representing this release length. It works only with exponential envelopes.

Envelope controls are described below:
Add Point (+): Add a new point after the selected one.
Delete Point (x): Remove the selected point.
Center Point (Pan & Pitch EG only): Centers vertically the selected point on the axis.
Sustain Point: Attach sustain to the selected point. The envelope will be stuck on this point until the key is released.

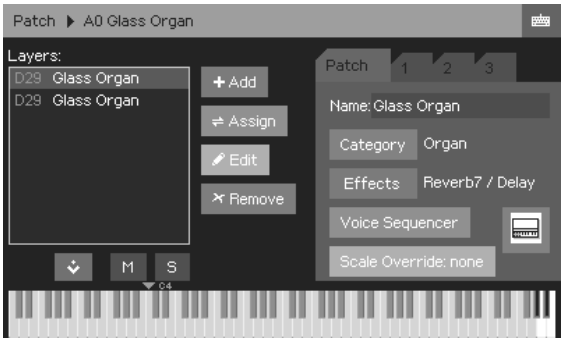
Skip on Release (only shown when Sustain Point is selected): If checked, when the note is released before reached the sustain point, the envelope value will jump to this point.
Segment Loop A / B: Sets the Loop Start and Loop End points of a segment loop, which can take in several segments. Loop must be set before the sustain point to work.
Remove Loop (only shown when a point with loop is selected): Removes the Loop Start and Loop End markers.
Linear / Exponential (only shown when no point is selected): Sets the envelope in Linear or Exponential mode.
Selected Point Information: On the page bottom line, selected point coordinates are shown to help you adjusting them.
The currently selected point can be adjusted via hardware controls: the main jog wheel sets its horizontal position, while INC/DEC keys sets its vertical position.
The Direct Access knobs adjust the horizontal position of the corresponding numbered points.

Patch mode



In Patch Mode you can organize, play and edit Patches. This mode responds to the Global Channel, see Global > MIDI configuration. When going into Patch Mode, the first page displayed is the Patch List.
Like in Voice mode, parameters on the Patch List page aren't saved into any patch (Pitch Bend Range, Volume, Pan…).
"Edit" brings you to the Patch Editor.
"Swap" swaps the current patch with the patch of your choice. Pressing this button will open a popup that has an "Update related performances" checkbox. It's very important to keep it checked if the two patches you are swapping are used in a performance. All performances using them will be modified accordingly and are now in unsaved state (you need to save them afterwards).
"Clear" clears the current patch.

Patch editor



Layer list: All voices layered into the current patch are listed here. It allows you to select the layer you want to work on, whose parameters are on tabs 1 to 3.

Add Layer (+): Adds a new layer based on the previous element.

Assign Layer: Assigns a voice to the selected layer.

Edit Layer: Opens the selected layer in the Voice Editor. You can edit the voice and hear it in context, but beware that any modification impacts all patches using the same voice.

Remove Layer (x): Removes the selected layer from the patch. It doesn't delete the original voice.

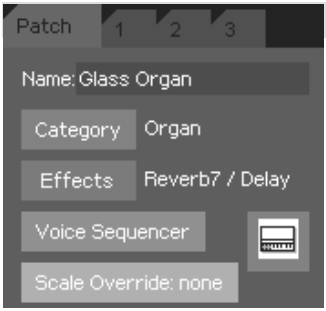
Move Layer up: Puts selected layer before the previous element in the list.

Move Layer down: Puts selected layer after the previous element in the list.

Mute Layer: Mutes the selected layer. This setting is stored into the patch.

All **Mute All**: Toggles mute for all layers.

Patch settings



GENERAL PATCH SETTINGS

Name: Sets the patch name

Category: Assign a category to current patch (cf. Sorting section in Global Mode)

Effects: See the Effects section for more information.

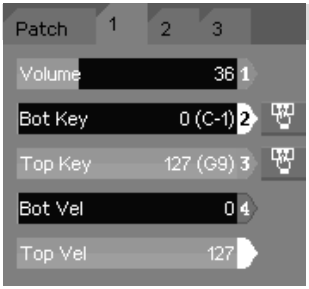
Voice Sequencer: See dedicated section below

Icon: Sets an icon to your patch

Scale Override: selects which scale will be used by all the layers in this patch. By default ("none") each layer/voice will use its own scale (see "Scale" parameter in the Voice Editor)

Layer settings

The following parameters are relative to the current selected layer in the list.



LAYER SETTINGS PAGE 1

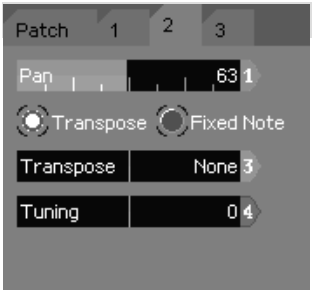
Volume (0 ~ 127): Sets the layer volume

Bottom Key (0 ~ 127): Sets the layer bottom bound note. You can use MIDI Learn button on the right to set it directly via your MIDI controller.

Top Key (0 ~ 127): Sets the layer top bound note. You can also use MIDI Learn button on the right to set it directly via your MIDI controller.

Bottom Velocity (0 ~ 127): Sets the lower velocity bound from which the layer should be heard.

Top Velocity (0 ~ 127): Sets the top velocity bound at which the layer should be heard.



LAYER SETTINGS PAGE 2

Pan (0 ~ 127): Sets the selected layer pan position.

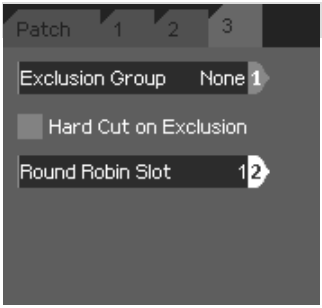
Transpose mode: In this mode, selected layer will respond to the incoming MIDI note pitch

Fixed mode: In this mode, selected layer will ignore the incoming MIDI note pitch

Transpose *[Transpose mode only]* (-36 ~ +36): Sets the incoming note pitch offset

Note *[Fixed mode only]* (0 ~ 127): Sets the selected layer pitch

Tuning (-100 ~ +100): This parameter allows to set the note pitch really precisely.



LAYER SETTINGS PAGE 3

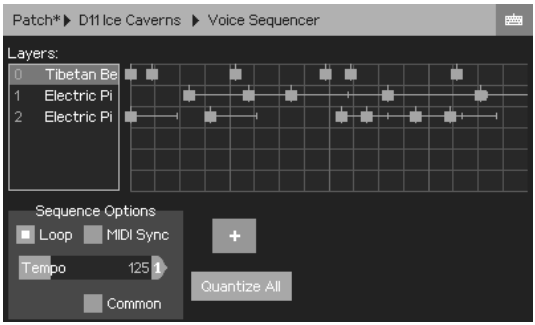
Exclusion Group (None, 1~8): Sets the Group in which all notes, from the selected layer, shouldn't be allowed to play simultaneously. For example it can be used to stop open high-hat sounds when the closed high-hat sound is played.

Hard Cut on Exclusion: By default, Exclusion Group stops the sounds by triggering their envelope release state.

Checking this option completely cut the sound instead. That can be used to make true mono layers in your patch.

Round Robin Slot (1 ~ 32): This feature allows you to play the selected layer sequentially, each time you trigger a note. For example, if you've got 2 layers which are respectively in slot 1 and 2, the first incoming note will play on the first layer, the next note on the second layer, and so on.

Voice Sequencer



The Voice Sequencer is a powerful tool to make rhythmic and evolving sounds, following its own tempo or locked to an external MIDI Clock.

It basically works like any event-based MIDI sequencer, but in a simpler way. Each layer appears like a track in which you can put one or more events. Each time you press a note on your keyboard (or other controller), a Voice Sequencer instance starts.

There are two kind of events: note and swap. Note event triggers a note on the corresponding layer. Swap event swaps the current FM parameters of the layer with another one (it may create strange effects depending on the sounds you are swapping).

You can add, drag horizontally, and remove any event into the sequencer grid in order to compose a sequence following your creativity.

There can be a maximum of 128 events in the Voice Sequencer, and the time grid has a 128-step resolution.

Layer List: Selects the layer you want to work on.

Sequencing Grid: The main area where you put events to build your sequence.

Loop: When checked, the sequence will play indefinitely until you release the note.

MIDI Sync: When checked, the Voice Sequencer will lock to an external MIDI clock, instead of internal tempo. Caution: be sure your sequencer (or any other MIDI controller) is able to send this kind of message when you're using this feature, otherwise your Voice Sequence won't play at all. When a tempo is received, its approximated value is shown under the Tempo slider.

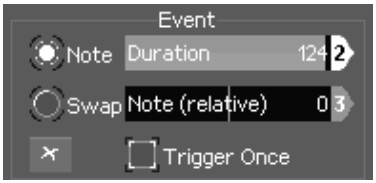
Common *[only noticeable when several notes are played at the same time]*: Forces all

instances to stay in sync with each other. The Voice Sequencer will start from the beginning for the first note played, then the instances coming after will start from the current position of the first instance. This feature helps keeping a clean sound while you're playing chords, especially if the sequence has rhythmic elements and arpeggios into it.

Fixed Tempo *[Internal Sync mode only]* (1 ~ 500): Sets the internal Voice Sequence tempo

Step division *[MIDI Sync mode only]* (0.125 ~ 2): Sets the grid division of the sequence when synced to an external MIDI clock.

Add Event (+): Adds an event into the selected layer track.



Quantize: Moves the focused event to the closest beat.

Quantize All: Align all events to the sequencer grid.

When an event is selected, a panel displays its parameters.

Event type (Note/Swap): Selects the current event type, which was detailed in Overview section below.

Duration *[Note event only]* (0 ~ 126 ; Infinite): Sets the event length, and allows to simulate a Note Off event. If set to infinite, this event won't be simulated. Note: A real Note Off event, incoming from MIDI, will always be a priority!

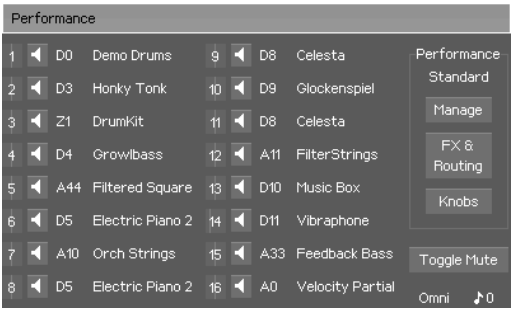
Note *[Note event only]* (-48 ~ +48): Sets the note event transposition, relatively to the incoming MIDI note pitch.

Layer Number *[Swap event only]*: Sets the layer to which the note will be swapped.

Trigger Once: Triggers the event only once if the sequence is looped.

Delete Event (x): Removes the selected event.

Performance mode



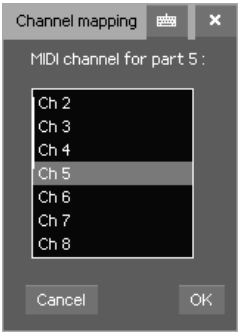
This is the most powerful mode in the EssenceFM, allowing up to 16 patches to be played simultaneously on any of the 16 MIDI channels.

Manage: Goes to the *Performance Manager* page, described below.

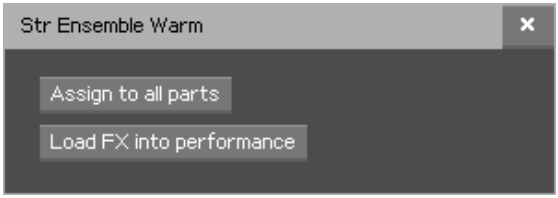
FX & Routing: Goes to the *Performance*

Effects and Routing page.
Knobs: Goes to the *Knob assign* page
Toggle mute: Mute all unmuted parts and vice-versa.

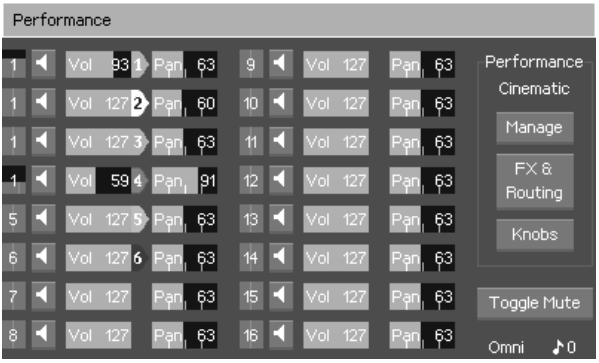
Pressing the individual **Mute** buttons mutes the selected part.



For each part, pressing the **MIDI channel number indicator** opens a popup to change it. You can layer patches together by putting several parts on the same MIDI channel.

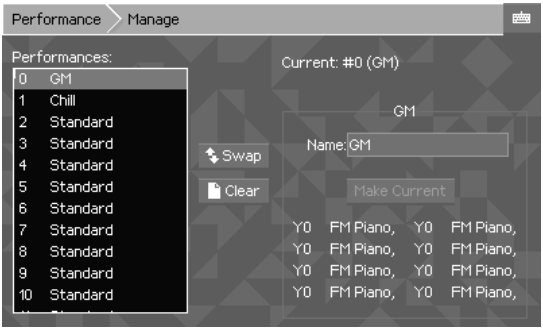


Keeping pressed the **patch name** for more than a second will display a popup with two buttons.
Assign to all parts: The same patch will be assigned to all parts with the same volume, which is useful to setup a performance for MPE controllers.
Load FX into performance: That allows you to load the patch effects into the performance.



Pressing the Performance button when already on the Performance page toggles between the normal view displaying the patch names and the mixer view. The mixer view allows you to easily set each part Volume/Pan.

Performance Manager



On this page you can manage all the 256 performances stored in the EssenceFM. There can be only 1 active performance at a time, in this screenshot it's the first one.

Performance List: One among the 256 performances can be selected here. The first 8 parts of the selected performance are displayed as a preview, at the bottom right of the screen.

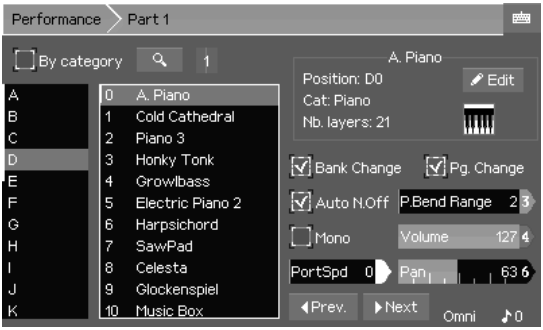
Swap: Swaps the selected performance with another you select via the shown dialog.

Clear: Resets the selected performance to default.

Name: Sets the performance name.

Make Current: Loads the selected performance to use it.

Part Editor



Bank / Patch Lists: Those lists allows you to select the patch you want to assign to the selected part

By Category: Toggle the Bank/Patch Lists into Category/Patch lists mode

Find : This function allows you to browse among patches according to a string you entered.

MIDI activity indicator: Shows the Pan, Volume, Channel and MIDI activity

Edit: This button goes into Patch Edit Mode, but you still hearing it in Performance context.

Pitch Bend Range (0 ~ 96): Pitch Bend range in semitone

Volume (0 ~ 127): Volume of the part

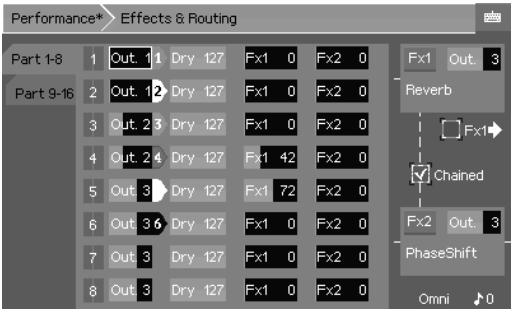
Pan (0 ~ 127): Pan of the part

Mono: Switches part to mono playing mode. The EssenceFM handles mono by triggering the Release envelope stage of operators. For true mono behavior, see Patch > Tab 3 > “Hard Cut on Exclusion”.

Portamento Speed (0 ~ 127): Portamento Speed, works only when the part is in Mono Mode.

Previous / Next: Jumps to the previous or next part without having to go back to the main Performance page.

Effects and Routing



Effect levels and output routing are configured here.

- **Output** pair (1~4)
- **Dry** level (0~127), the amount of original sound from the FM engine that is sent directly to the output
- **Fx1** send level (0~127), the amount of signal sent to the first effect DSP
- **Fx2** send level (0~127), the amount of signal sent to the second effect DSP.

Chained checkbox: Puts FX1 and FX2 in series

Fx1 checkbox: when in Chained mode, allows FX1 to still go to the output directly.

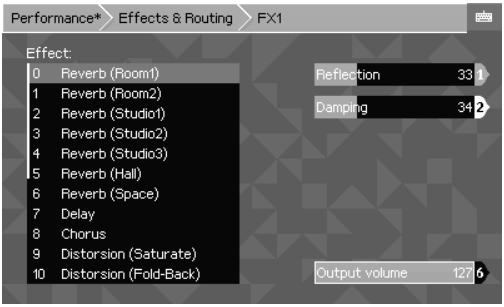
Each effect DSP can be routed to any output pair, and the effect can be selected by pressing the **Fx1** and **Fx2** buttons.

If you want to use the 8 outputs of the EssenceFM as 8 separate mono outputs instead of 4 stereo ones, use the panning of each part to output the signal only to the left or right channel (see previous section *Part Editor*).

Important note: You have two ways to setup a Performance when using the EssenceFM with your favorite sequencer:

- Setup everything (pan, volumes, effects etc.) on the EssenceFM: in that case, you may need to filter out these MIDI messages in *Global > MIDI > Filters* to prevent your sequencer changing them.
- Use your sequencer to setup the performance. In that case, do not bother editing these parameters on the EssenceFM.

Effect selection



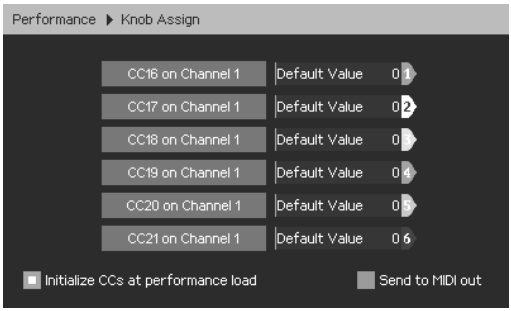
The list on the left selects the effect.
Each effect has un to 5 parameters, displayed on the right side.

Output Volume: sets the output volume of the effect DSP.

Effects settings are saved into each Performance and Patch. In Performance mode the effect DSPs are global so patch effects are ignored.

Effects are also controllable via MIDI, see *Automation* section.

Knob Assign



In this page you can assign the 6 Direct Access encoders to 6 MIDI CCs, which will be effective when the EssenceFM is on the main Performance page. It's a powerful way of controlling sound parameters in real time, if you assigned the same CCs in the modulation matrix of your Voices.

CC Assign button: The button caption shows the current CC and MIDI channel assigned to the knob. Pressing it opens a popup to change them.

Default Value (0 ~ 127): This slider assigns a default value to the corresponding knob CC.

Initialize CCs at performance load: If checked, CCs will be initialized to their default values when the performance is loaded.

Send to MIDI out: Send CCs to MIDI output to control your external gear.

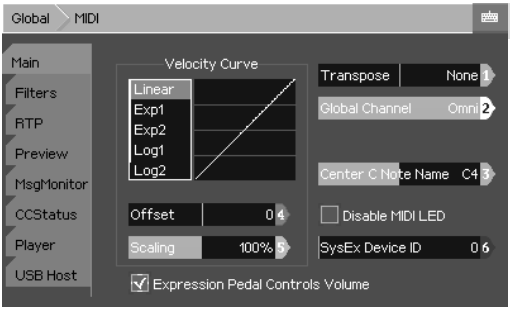
Global mode

All the EssenceFM global parameters are accessible here.

When entering this mode, the current active mode (Performance, Patch or Voice) keeps running in background without any sound interruption.

MIDI and Display settings are automatically saved when leaving the page. For most other elements (Scales, Waveforms, Categories) they will appear with an asterisk when modified, so they need to be saved manually by pressing the "Save" button.

MIDI



MAIN TAB

Velocity Curves:

Shape: Choose from Linear, Exponential, Logarithmic or Fixed modes.

Offset (-64~64): Vertical offset

Scaling (0~200%): Vertical scaling

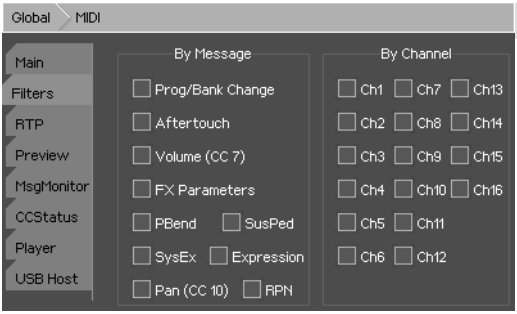
Transpose (-36~+36): Global transposition, in semitones

Global Channel (1~16 + Omni): MIDI channel that responds to the Global Channel, which is used for Patch and Voice modes. (and Performance, if you assigned a Part to to the Global Channel).

Center C Note Name (C3~C5): Choose the center C note name according to your regional standard. This parameter is purely for display purposes, it does not affect the sound in any way.

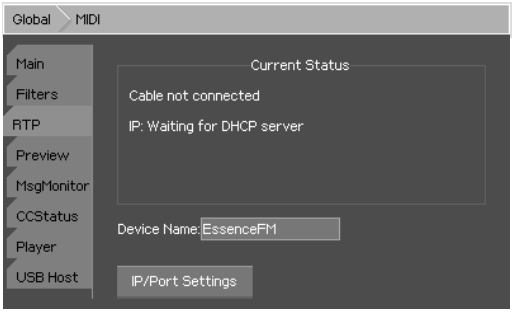
Disable MIDI LED: If checked, disables the MIDI activity LED

SysEx Device ID: Selects the Device ID for this EssenceFM. It will respond to SysEx that target it (useful mostly if several EssenceFM are connected through the same MIDI bus)
Expression Pedal Controls Volume: By default the expression pedal affects the Voice volume. Uncheck this feature if you don't want it or if you want to control the voice volume with the modulation matrix.



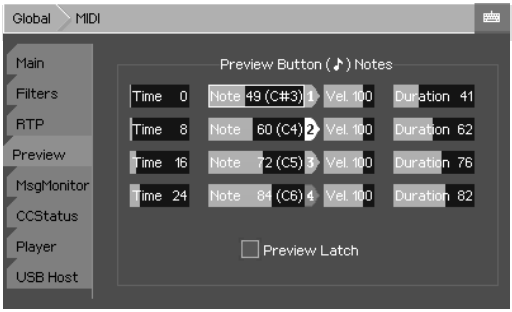
MIDI FILTERS

Check a message type or MIDI channel number to filter (block) it.



MIDI-RTP (ETHERNET)

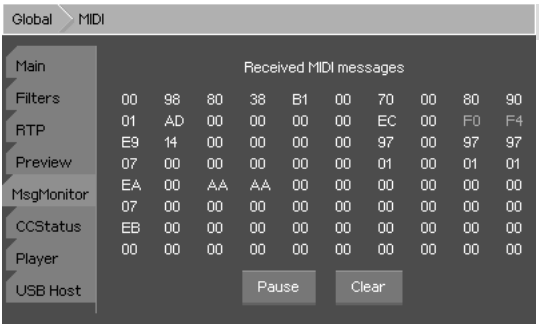
Device Name: Sets the device's name which will be broadcast on the network.
IP/Port Settings: Selects the IP addressing mode (Fixed/DHCP) and settings (IP, Mask, Gateway, Port number).



SOUND PREVIEW

Here you can configure the notes played when pressing the [♪] button. For each note there are 3 parameters:
Time (0~127): Time offset when the note has to be triggered.
Note: Note number.
Vel (0~127): Velocity of the note
Duration (0~127): Note duration.

Preview Latch : If checked, the preview won't stop when releasing the [♪] key.

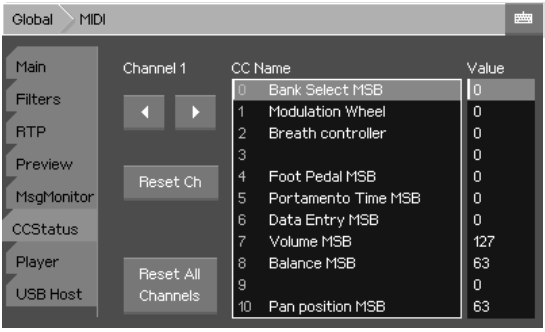


MESSAGE MONITOR

Displays the last received MIDI messages as hexadecimal values. That can be used to check if a controller/sequencer sends the MIDI events you're expecting.

Pause/Resume: Press to freeze the display, press again to receive new events

Clear: clears the display



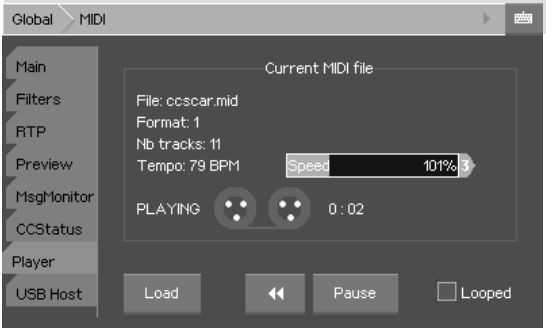
CC STATUS

Displays the current CC values for each MIDI channel.

Arrows: Navigate between channels

Reset Ch: Resets all CC to their defaults for the selected channel

Reset All Channels: Resets all CC on all channels



MIDI PLAYER

Here you can play MIDI files in background while editing sounds or playing. Playing a MIDI file is handled like if the MIDI data was received from the connectors, and is merged with others MIDI streams. You can use both the MIDI player, USB and DIN connection at the same time.

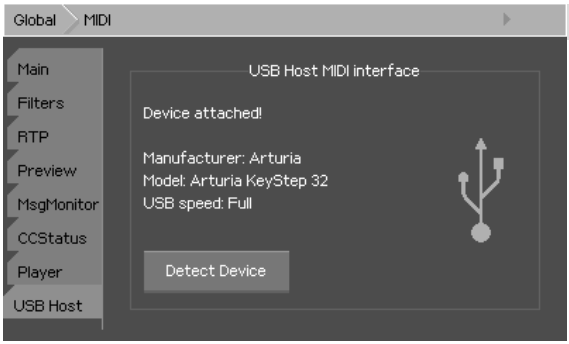
Load: Selects the MIDI file to load from the USB drive

Rewind: Restart playback from the beginning

Pause/Resume: Pauses/Resumes the playback

Looped: When checked, the song will seamlessly loop forever
Speed: Changes the playback tempo relative to the original MIDI file tempo (%)

When playing, an arrow icon is displayed on the top right corner

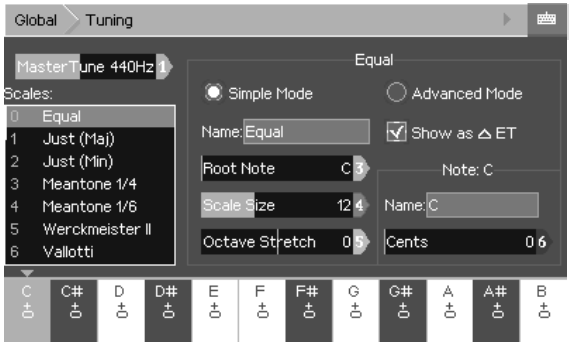


USB HOST DETECTION

USB-MIDI devices are detected during the boot time, but hot-plug isn't supported. This page allows to do a manual USB detection if you plugged your USB keyboard after powering the EssenceFM. Simply press "**Detect Device**" and the device will be ready to use.

Tuning

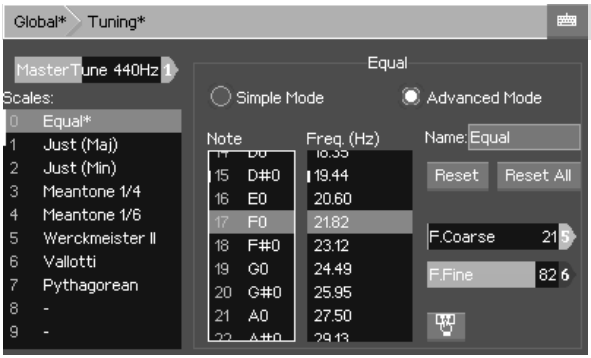
This page provides access to the master tune setting and scale editor. Voices can choose which scale they use.
Simple Mode/Advanced Mode: The Simple Mode (default) allows you to define a scale that the EssenceFM will spread automatically on the whole keyboard. In Advanced Mode, you're free to assign an arbitrary frequency to each of the 128 notes, in 1/100th of a Hz.



SIMPLE MODE

Name: Sets the scale name
Root Note: Base note for the scale.
Scale Size (1~32): Number of notes in the scale.
Octave Stretch (-50~+50): Allows to stretch the octave. Zero means each octave is double the frequency. A negative value will make it smaller, while a positive value will make it wider.

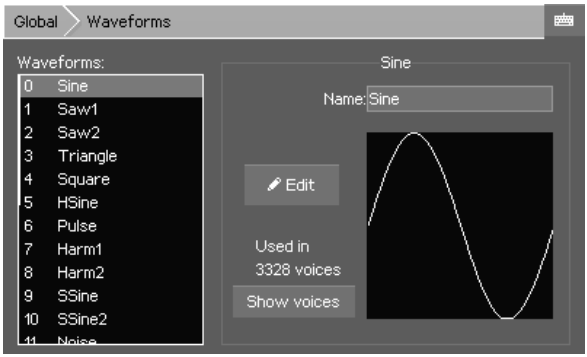
Show as Delta Equal Temperament: instead of showing the values in absolute Cents, it shows them relative to Equal Temperament (only relevant if scale size = 12).
Note - Name: The note's name.
Note - Cents (0~1200): The note's tuning value. 1200 = frequency of the next octave.



ADVANCED MODE

Name: Sets the scale name
Reset: Resets the selected note using its frequency calculated from the Simple Mode
Reset All: Resets all notes using their frequencies from the Simple Mode
F.Coarse: Sets the note frequency in Hertz
F.Fine: Fine-tune the note frequency in 1/100th of a Hertz

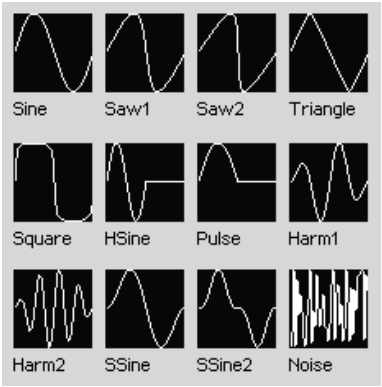
Waveforms



This page shows you all the waveforms stored in the EssenceFM.
When entering this page, current Performance/Patch/Voice modes are temporarily overridden, allowing you to play them directly from your MIDI controller.

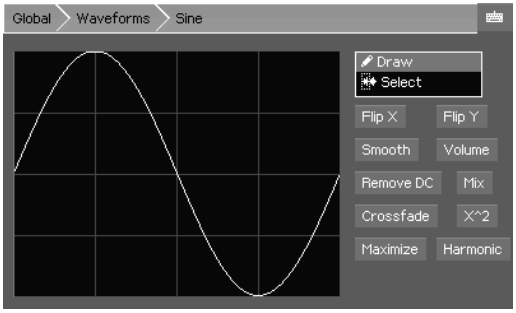
Name: Renames the waveform.
Edit: Goes to the waveform editing page.
Show voices: Shows which voices are using the selected waveform. This is very useful as the waveforms are global to the EssenceFM - they are shared between voices. You need to be careful when modifying one, as all voices using it will be impacted.

The EssenceFM has 24 editable waveforms, it comes with 12 presets and 12 empty slots.



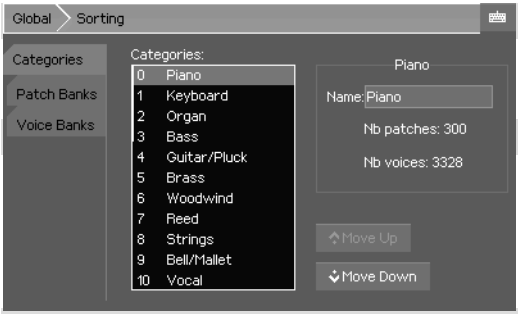
Preset waveforms

Waveform Editor



In **Drawing** mode, the waveform can be modified directly by pressing then moving the finger on the touchscreen.
In **Selection** mode, parts of the waveform can be selected to apply transformations only to it.
Flip X: flips the waveform horizontally.
Flip Y: flips the waveform vertically.
Smooth: smooth the waveform. Press several times to smooth more.
Volume: scales the volume, from 0 to 200%.
Remove DC: centers the waveform vertically (removes any DC offset).
Mix: mix the waveform with another waveform.
Crossfade: smooth the waveform ends to make it seamless.
X^2: elevates the waveform to its power of 2.
Maximize: scales and centers the waveform to use the maximum amplitude.
Harmonic: adds a partial (harmonics 1~40) to the current waveform.

Sorting



CATEGORIES

Here you can organize and rename the Patch/Voice categories.

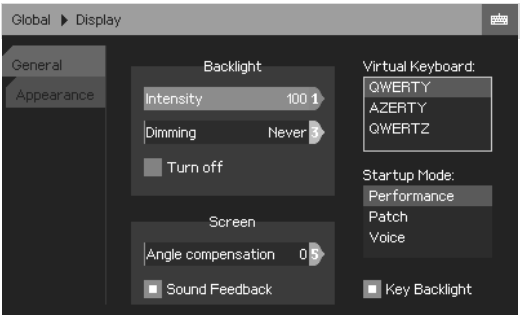
PATCH BANK

To swap/clear whole patch banks. Changes aren't saved until you go to the Patch Mode and press Save.

VOICE BANKS

To swap/clear whole voice banks. Changes aren't saved until you go to the Voice Mode and press Save.

Display



GENERAL SETTINGS

Screen Backlight Intensity (0~100): Adjusts the backlight brightness.

Screen Backlight Dimming (Never / Adjustable / Delay): Selects a delay before the display is dimmed to extend its lifetime and lower power usage.

Turn off: When checked, if Dimming is not on "Never", the display will be completely turned off instead of being dimmed.

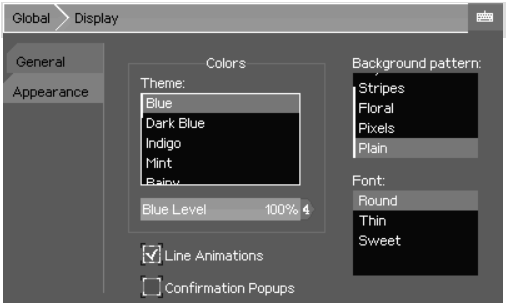
Angle compensation: Changes the screen contrast to provide better readability when your EssenceFM is below your eyesight.

Sound Feedback: When checked, a soft clicking sound will be emitted each time you press the touch screen. The sound is emitted from the internal buzzer, it does not affect the audio output.

Virtual Keyboard: Selects the layout used for the alphanumeric keyboard.

Startup Mode: Sets the default mode the EssenceFM starts into.

Key Backlight: Enables LED backlight under the keys.



APPEARANCE

Color Theme: Selects the color theme for the interface.

Blue Level: Adjusts the global blue level.

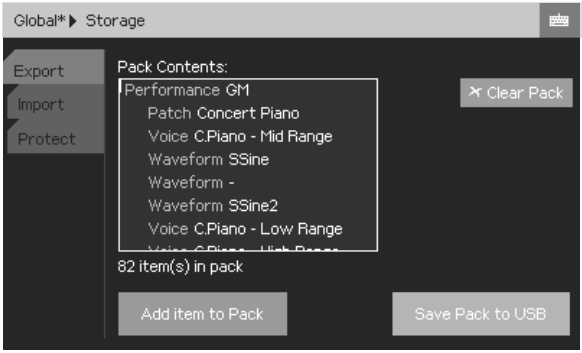
Line Animations: Enables line animations that are used for connecting operators on the Voice page and for showing the audio signal path on the Effects page.

Confirmation Popups: Enables confirmation popups on Save/Recall/Overwrite actions.

Background Pattern: Selects the background pattern.

Font: Selects the font used on every page.

Storage

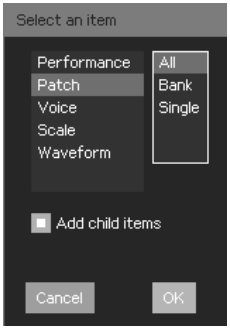


EXPORTING

This page allows you to export elements to USB mass-storage device.

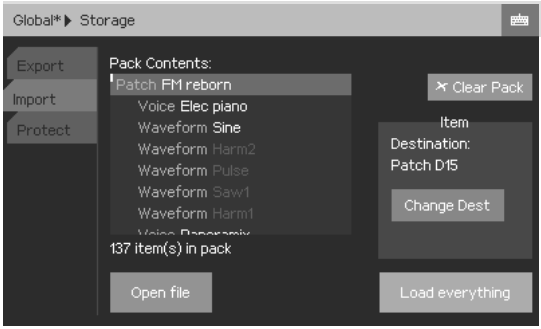
Exporting is done by saving elements into “packs” which are then saved as a file.

Add item to pack: choose which elements (voices, patches, performances...) you want to add. On the item selection popup, the “Add child items” checkbox allows to save any item that is linked to the one you’re exporting. It’s strongly advised to keep it checked. For example, a Patch uses many Voices which in turn use many Waveforms. This is mandatory to have your sounds correctly imported into another EssenceFM.



Once the pack contains everything you want, press **“Save Pack to USB”** to save it as a single .efm file.

Clear Pack: clears the current pack contents



IMPORTING

Open file: Selects the pack to import. Supports a variety of formats besides the EssenceFM (.efm) packed format: Scala files, DX7 SysEx dump files and Wave files.

Clear Pack: clears the currently loaded pack

Change Dest.: For each element in the pack you loaded, the EssenceFM will choose a free slot to import them into. You can manually change this slot by pressing this button.

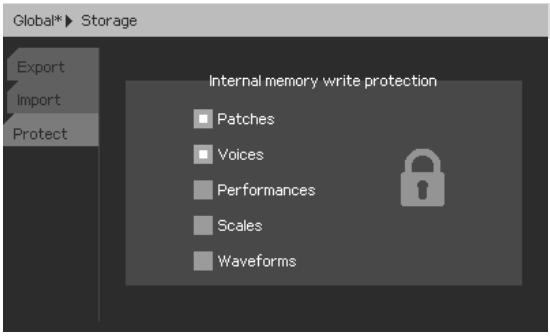
Load everything: proceed to load your pack. Imported items aren't saved automatically into permanent memory. Imported items will have an asterisk (*) mark next to them. To make them permanent, you need to press Save when you're on the corresponding pages (Patch List, Voice List etc.)

Like on the screen capture above, some waveforms found in the pack are grayed. That means you already have them, so they won't be imported.

That duplicate check is only done for waveforms.

If you don't have enough free slots for importing items, they will be displayed in red.

Note about loading wave files: the EssenceFM uses 16-bit, 512-sample long waveforms. If your files don't have the right length or attributes, they will be automatically converted. Stereo files are converted to mono by mixing both channels together. 8-bit and 24-bit wave files have their dynamic range scaled to match 16-bit resolution.

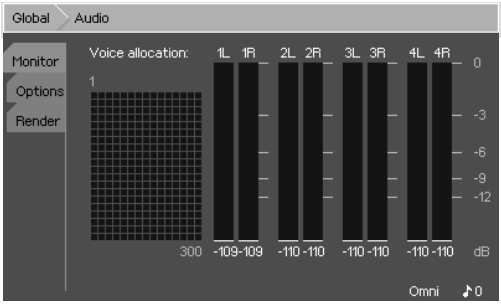


WRITE PROTECTION

Selects the items you want to protect from saving.

Any attempt to press Save on a protected item will show a popup telling the user it is protected.

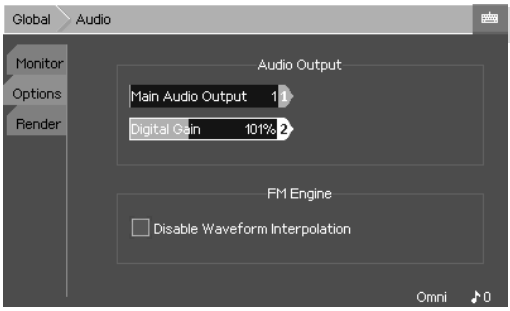
Audio



AUDIO MONITORING

This page provides a monitoring of the allocated voice channels in the FM engine and vu-meters for monitoring the audio output.

Notes currently playing are represented by a green dot, they carry an instance of the Voice Sequencer. Each allocated voice (the sequencer may trigger many of them) is represented by a white square if it's currently ON, or gray square if it's in release state.

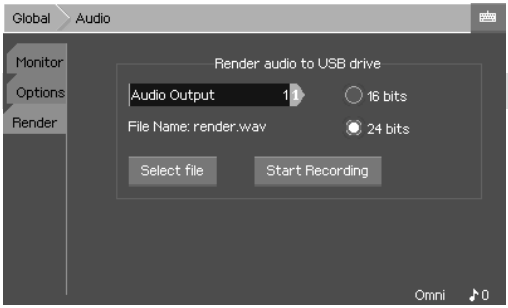


AUDIO OPTIONS

Main Audio Output: Selects the audio output used for Patch and Voice modes.

Digital Gain: Sets the global output volume. It's useful for minimizing noise if you play quiet sounds (high digital gain), or to avoid clipping if you play lots of stacked sounds (low digital gain).

Disable Waveform Interpolation: By default the EssenceFM applies a real-time linear interpolation to the waveforms to improve quality and reduce aliasing. You can disable this feature by checking that option if you prefer the raw sound, more like legacy FM chips used in 80-90's gear.



USB AUDIO RENDERING

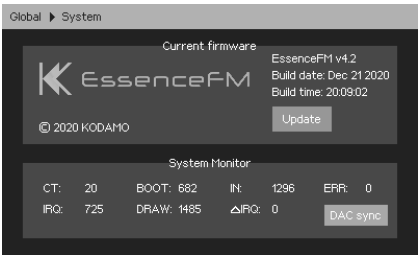
This is where you can start rendering audio to USB drive to get lossless wave recordings from the EssenceFM.

Audio Output: Selects the audio output to record

16/24bits: Selects the bit depth for recording
Select file: Choose the destination file (on the USB drive) to render the audio to.
Start Recording: Starts/Stops the recording. While recording you can use the EssenceFM normally, you simply need to go back to this page to stop it when you're done.

Note: If the USB drive is too slow or full, the recording will be automatically aborted.

System



The **current firmware** version and build date is shown on this page.

The **Update** button allows you to upgrade the firmware via a USB drive.

Updating your EssenceFM

- Go to our website: `https://kodamo.org`
- In the Support > Firmwares section, check if there is a more recent firmware available. If this is the case, click to download it. You get a file named « efm_fw.bin »
- Put this file on a USB drive. The file should be at the root, not in a subfolder.
- Plug the USB drive on the EssenceFM then press the **Update** button and follow the instructions.
- You now have the latest version installed!

Notes :

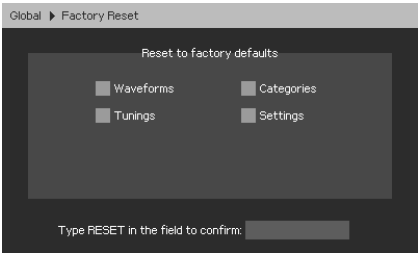
- Never turn off the EssenceFM while it's doing the update
- Installing an older firmware (downgrade) isn't possible, this is a one-way upgrade

The **System Monitor** is mostly useful for us to help you troubleshooting issues.

- CT: CPU temperature. Must be lower than 75°C
- IRQ: Audio engine rendering time. Should be lower than 980
- BOOT: Boot time in milliseconds. Usually between 800-3000
- DRAW: User Interface rendering time
- IN: Input scan time
- DeltaIRQ: Shouldn't reach zero

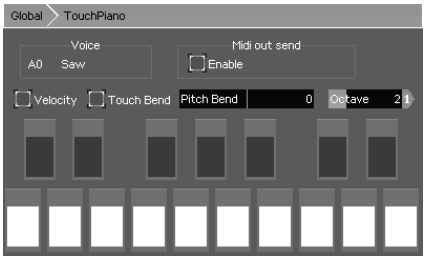
DAC sync: Press this button if the sound of your EssenceFM is distorted/glitchy. That may happen under very rare circumstances if you overload the CPU. This can also be fixed by restarting the unit.

Reset



Resets Waveforms, Tunings, Categories and Settings to their factory state.
Performances, Patches and Voices cannot be reset via this page, you need to clear the banks and import the factory sounds downloaded from our website.

TouchPiano



Provides a small touchscreen-based keyboard, for fun or as a last resort if your controller/input fails. The current selected sound from the current mode is used. To change it, go into a mode (Performance, Patch or Voice), select a Part/Patch/Voice then go back to the TouchPiano.

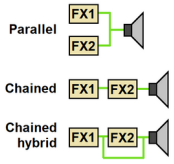
Velocity: When checked, different velocities can be triggered depending on where you press the button (top = loud, bottom = quiet).
Pitch Bend: Same as a pitch bend wheel but with the touch screen.
Octave: Selects the base octave of the keyboard.
MIDI Out Send Enable: Sends the generated note events to MIDI out.

Automation

When you are using the EssenceFM with a DAW or MIDI sequencer, you want to be able to save its patch/routing/effects settings and recall them automatically when needed. To do so, save your performance into one of the 256 slots, then use the MIDI CC 39 and CC 40 to load the desired performance.

CC 39	Selects the performance bank: 0 (default, performances 0 to 127) or 1 (performances 128 to 255)
CC 40	Loads the performance from the selected bank. (Performance number = CC39*128+CC40)

To change effects on the fly, the following CCs are used:

CC 47 - 48*	FX1 & FX2 type (see *Effect List*)
CC 51 - 55*	FX1 parameters 1 to 5
CC 56 - 60*	FX2 parameters 1 to 5
CC 61 – 62*	FX1 & FX2 output level
CC 90	MIDI channel dry level (amount of signal sent directly to the audio output, bypassing effects)
CC 91	MIDI channel FX1 send level (amount of signal sent to FX1)
CC 92*	Effect routing mode 0 = parallel 1 = chained 2 = chained + FX1 listen 
CC 93	MIDI channel FX2 send level (amount of signal sent to FX2)

* These CCs can be sent on any MIDI channel since effect processors are global.

Effect List

Each effect DSP can be setup to do the effects below. Effects parameters are listed in the right order for use with the CCs detailed above.

N°	Effect name	Effect parameters
0	Reverb (Room1)	Reflection (0 ~ 124), Damping (0 ~ 127)
1	Reverb (Room2)	
2	Reverb (Studio1)	
3	Reverb (Studio2)	
4	Reverb (Studio3)	
5	Reverb (Hall)	
6	Reverb (Space)	
7	Delay	Delay L (0 ~ 127), Delay R (0 ~ 127), Feedback (0 ~ 120), Cutoff (0 ~ 127)
8	Chorus	Speed L (0 ~ 127), Speed R (0 ~ 127), Depth (0 ~ 127)
9	Distortion (Saturate)	Threshold (0 ~ 127), Gain (0 ~ 127), Cutoff (0 ~ 127)
10	Distortion (Fold-Back)	
11	Distortion (Halved Negative)	
12	Distortion (Positive)	
13	Distortion (Abs)	
14	Bitcrush	Frequency (0 ~ 127), Bit Reduction (0 ~ 127), Cutoff (0 ~ 127)
15	Ring Modulation	Speed (coarse) (0 ~ 127), Speed (fine) (0 ~ 127)
16	Phaser	Speed (0 ~ 127), Depth (0 ~ 127), Frequency (0 ~ 127)
17	Rotary	Rotor speed (0 ~ 127), Stereo Depth (0 ~ 127), Distortion (0 ~ 127)
18	Equalizer	Low Freq (0 ~ 127), High Freq (0 ~ 127), Low Gain (0 ~ 127), Mid Gain (0 ~ 127), High Gain (0 ~ 127)
19	AutoWah	Speed (0 ~ 127), Cutoff (0 ~ 127), Resonance (0 ~ 100),

		Depth (0 ~ 127)
20	Phase Shift	Left (samples x10) (0 ~ 127), Right (samples x10) (0 ~ 127)
21	Long Tap Delay	Delay L (0 ~ 127), Delay R (0 ~ 127), Feedback (0 ~ 120), Cutoff (0 ~ 127), 2nd Tap Delay (0 ~ 127)
22	Shimmer	Reflection (0 ~ 124), Damping (0 ~ 127), Room Size (0 ~ 127), Shimmer Amount (0 ~ 127)
23	Mono Mix	Mode (0:both channels, 1:left only, 2:right only, 3:subtract), Gain (0 ~ 127)

Troubleshooting

Problem	Solution
Some notes are stuck active and I can't stop them	Press the "Panic" button. Check if there are any unterminated volume envelopes in the Voices you are using (the last envelope point of each carrier operator should be set to zero).
I have some voices and patches marked as "Corrupted" instead of their original name	Your probably had a power loss while pressing "Save". If accessing those elements crashes the device, clear and save them ("Clear" button on the Voice List and Patch List pages) . Unfortunately, corrupted elements can't be restored. If your electrical network isn't very reliable, we suggest regularly saving your work on a USB drive.
I can't hear any sound as I play	In Patch and Voice modes, check that the Main Audio Output parameter (found in Global > Audio) is set to the output jacks you are plugged into. For Patch and Voice modes, check that you are sending MIDI events on the Global Channel, which can be configured in Global > MIDI. In Performance mode, check that there is at least one Part assigned to the MIDI channel you are using, check that this part is routed to the right jack output ("FX & Routing" button), check that it isn't muted or has its volume set to zero.

	For all modes, check that your controller isn't sending MIDI expression CC with a null value. Press the Panic button to reset it to its maximum value. By going to the Global > Audio page you can see if there is audio signal generated, so you know if the issue is on the software or hardware side.
When I hit Play on my external sequencer, my part settings get modified	This happens if your sequencer sends a GM reset command or other MIDI channel settings like Volume, Pan, Pitch Bend Range etc. You can work in two different ways: • Use your sequencer to setup the whole performance (do not edit channel settings directly on the EssenceFM as they'll be overridden) • Configure your performance on the EssenceFM and remove any unwanted message from your sequencer using the MIDI filters (see Global > MIDI)
My USB drive isn't detected	Check it is FAT32 or exFat formatted. NTFS isn't supported.
I plugged a MIDI-USB device on the front port, but nothing happens.	MIDI class-compliant devices are supported but hot swap isn't. Go into Global > MIDI > USB Host to do a manual detection.
I found a software issue and want it to be fixed	Please describe the problem and how to reproduce it by writing at contact@kodamo.org. We'll work our best to fix any reported issues.
I sent tons of MIDI events triggering complex patches and now the sound is glitchy	There is a lot of CPU power to handle everything, but you may find cases where it can be overwhelmed if you trigger hundreds of very complex voice sequencer instances in seconds. If that happens, go into Global > System, press the "DAC sync" button and follow the instructions, or simply restart the EssenceFM. We suggest trying different techniques in your sound design to achieve similar sounds in a more efficient way.

Warranty

The EssenceFM is sold with an included 2-year manufacturer warranty, allowing two workshop returns in case of a defective product.
Normal wear and damage caused by the end user are not covered: liquid damage, impacts, electrical surges, use of the wrong wall adapter, use in high-temperature environments (>40°C) or any other inappropriate use of the device.
If you need to return the product under warranty, please send us an email (contact@kodamo.org) describing what happened and we'll send you the procedure.

Maintenance and Care

To clean up your EssenceFM, use a soft piece of cloth. Knobs can be removed to make cleaning easier.

Electrical characteristics

Power pack: 12V DC 2A
Plug: 2.1mm jack barrel, center positive
EssenceFM power consumption: < 10W
Max front USB current capability: 1A

Notes

Pictures on this manual are for illustration purposes only. Some details may vary depending on the settings that were used to do the screen captures. This manual was made for the EssenceFM with firmware V4.2. Further updates may introduce new features that aren't described in that manual, please check online PDF manuals at https://kodamo.org to get the latest version.

Printed in France

Memo