FLUX

USER
MANUAL

CONTENTS

GENERAL DESCRIPTION

FLUX brings you the musicality and expression of classical instruments such as violin or vocals, enriched by new timbres and the flexibility of postmodern epoch instruments — all connected to the power of new technology and true innovation. FLUX is an all-top-class synth — from its expressive capabilities and interface design, all the way to the DAC and the analog part of the circuit.

At the heart of FLUX lies a unique non-contact magnetic interface, endowing your performance with the inimitable beauty and flexibility found in the Theremin. It consists of two magnetic bows held between the player's fingers, and an interface-keyboard — a multi-pole magnetic field pickup registering the placement, movement and tilt of the bows, as well as which pole of the bow is directed towards the instrument.

That enables using your right hand to control up to 5 parameters, the main being the pitch and volume of the notes, and your left hand to control up to 12 parameters related to timbre, modulation and rhythmic sequencing. That makes for up to 17 independent sound parameters, controlled by the bows in real-time and without touching other controls on the instrument. That allows you to synthesize a unique timbre literally for every note and it opens new horizons for expression and playing skills.

The interface's minimalism helps focus your attention on what's important: the flux of music and emotion — playing, not programming. All control of the instrument is done via 8 touch sensors and a magnetic keyboard serving as a 70 cm/2.3 ft slider, very convenient for controlling volume, reverb mix and so on. The absence of mechanical controls rising over the panel makes FLUX a very reliable and robust instrument for use and transportation, withstanding long tours without the need for setup or maintenance.

FLUX is an all-digital instrument designed with an emphasis on stability and reliability which are crucial for professional performance work. Despite the complexity and subtlety of FLUX' magnetic interface, the clever auto-calibration and balancing system keeps the magnetic keyboard always tempered and in-tune, regardless of temperature, humidity, equipment or items close to the instrument.

FLUX's synthesis is based on a DSP with an entirely in-house developed code, no ready-made blocks or libraries were used. It's organized as a set of synthesis algorithms, each of them a standalone architecture and a complete musical instrument. This allows for a wide tonal palette, while using just a moderate number of controls for a synth. The algorithms include: analog synthesis modeling, FM, physical modeling of resonance processes, and a range of unusual algorithms, such as a lo-fi 8-bit integer-math based synthesis, and bit-bending.

FLUX can work in **monophonic** mode, or in **duophonic** — when two bows play an independent note each, or in **polyphonic** — in which, at removing the bow from the keyboard the note continues to play decaying gradually, while another nearing of the bow triggers a new note. There's also a percussive mode, allowing for sounds with a fast, articulate attack.

A sustain pedal can be connected, allowing FLUX to memorize the state of the magnetic keyboard's *timbral* area and freeing up the left hand for a duophonic performance, or to create more complex timbres by layering the states of the timbral controller. The sustain pedal can also control the modes of the magnetic keyboard's *Notes* area.

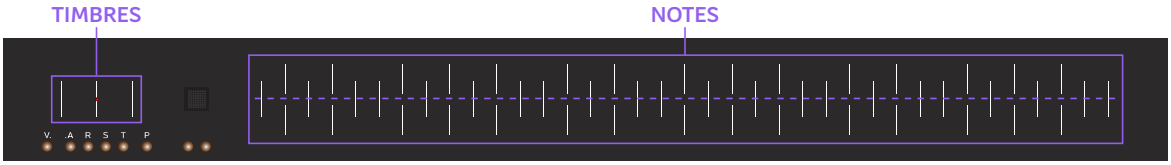
The digital-to-analog converters and the analog part use in-house designed circuitry using Hi-End principles, lending FLUX a warm sound.

The instrument's software is updated using a USB drive, including new synthesis algorithms to be released in the future. User-created presets are storable to and loadable from a USB drive.

FLUX can also be used as a powerful MIDI and CV controller allowing new scopes of expression for your Eurorack system, analog and digital synths. This requires a specially designed breakout box that plugs into FLUX's USB slot, and which has 11 CV outputs and one MPE MIDI output. All parameters taken from the magnetic keyboard are then available as unipolar and bipolar CV signals and MIDI CC data.

THE MAGNETIC KEYBOARD INTERFACE

The interface is divided into two areas: the left for timbre, and the right for pitch.



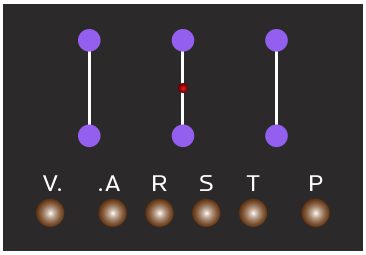
The *Notes* area's sensors are placed on the axis of the pitch marks (the dotted line).

To achieve maximum volume of the playing note, the magnetic bow must be brought close to the center line seen above. Moving the bow along that line (X-axis) sets the note's pitch. The distance from the line to the bow (Z-axis) sets the note's volume and, in some algorithms, the timbre. Tilting the bow left or right controls the modulation parameters, individual to every algorithm. Reversing the bow the other pole down transposes the keyboard a set number of octaves. The Y-axis movements are not registered (it was decided that adding a Y-axis would overload the player's attention, already taken by complex and important tasks like intonating by ear).

The Notes keyboard is marked piano-style: single lines for white keys, double lines for black keys.

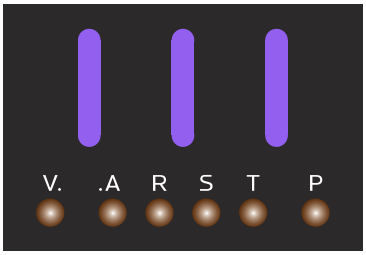
The keyboard range is three octaves plus C-note of the fourth. 37 notes total.

The *Timbres area's* magnetic sensors are located on the ends of the white lines.

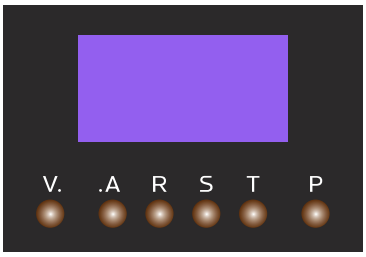


The sensors can be configured in various ways depending on the synthesis algorithms. For example, we can use all six sensors independently, registering the power and polarity of the magnetic field in each of the six spots. In that case, we can control 12 independent parameters (the positive magnetic field controls one set of 6 parameters, the negative controls another 6).

Or, sensors can be linked into three pairs, each of which then becomes a two-dimensional YZ controller setting a pair of parameters, switchable by turning the bow upside down (*flipping*).



And finally, all six sensors can be grouped into one big XYZ controller, with a mode switch by flipping the bow.

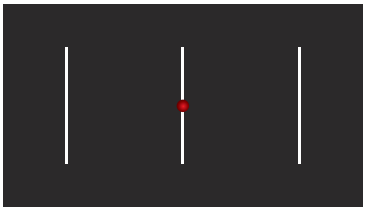


Every algorithm's description contains the configuration of the Timbres area of its interface, which parameters it controls, and how.

The magnetic field registered by the Timbres area is indicated by a dot upper-left on the screen. The magnetic field being registered by the *Notes area* is indicated by a dot upper-right on the screen.

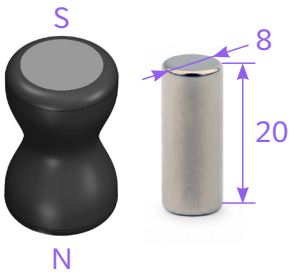
When the interface registers a magnetic field stronger than its sensitivity threshold, these dots are lit. That can be useful information, e.g. when deciding on whether a manual interface calibration is needed.

A red power-on indicator is placed in the center of the Timbres area, which also helps to position your left bow in poor lighting and/or using your lateral vision.



MAGNETIC BOWS

A magnetic bow is a standard cylindrical neodymium magnet of 8x20 mm, in a plastic enclosure.



The magnet's south pole is marked by a white plastic filling and normally is to be directed downwards, to the keyboard. The *flip* of the bow is done by directing its north pole (black side) to the keyboard.

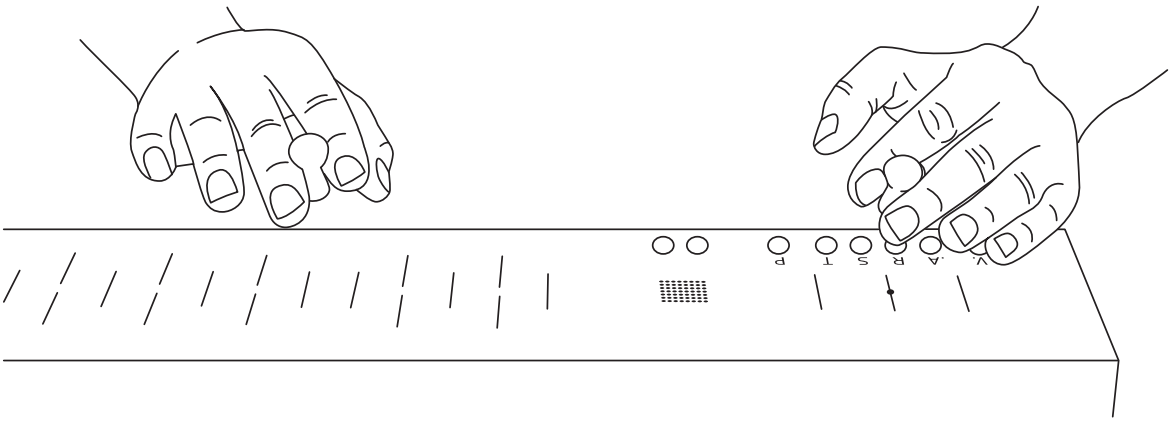
You can experiment with form and force of the magnets, as well as vary the bows' construction. E.g., a bow can have the form of a ring on your finger, or a stylus. Depending on the magnet's force, you can get various dynamic curves of FLUX's dynamic response.

It is prohibited to use magnets that are more than 4 times stronger than the magnets in standard FLUX bows! An excessive magnetic force placed close enough can leave a constant residual magnetization on FLUX's internal components and lead to inaccuracies in the keyboard's operation.

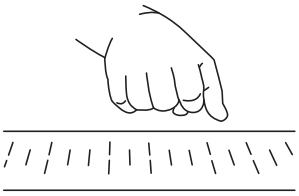
The standard FLUX package contains four magnetic bows.

Of course, as a new instrument, FLUX hasn't yet developed its standard school of playing, and each performer is free to come up with techniques uniquely their own. However, during our development process we designed playing methods and techniques we would like to share and propose them as a basis for mastering the instrument.

This is how we recommend to hold the bows:

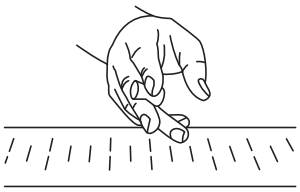


Hold them between your index and middle fingers by the thin middle section, designed expressly for good grip. This lets you easily perform the two main sound extraction techniques: the Flip and the Tilt of the bows.



To flip the bow, just fold your fingers towards your palm.

This easy and natural movement directs the other pole of the bow towards the instrument, which will switch octaves for the *Notes area* of the keyboard, or switch the synthesis parameters for the *Timbres area*.



Use this movement to tilt the bow.

For the *Notes area*, this will engage additional modulation, individual for each synthesis algorithm, and sensitive to which side and at what angle the bow is tilted.

To best master the use of the bows, as well as the whole instrument, it is recommended to play scales and various exercises, in which the right hand plays a sequence of notes, and the left switches timbres, changing the sound during the sequence; also, to play staccato, legato, learn to form a note's attack and decay, frequency and amplitude vibrato, glissando etc. It helps to base your exercises on those of such non-tempered instruments as violin or vocals.

It is not recommended to store your bows by magnetizing them to your instrument's metallic stand. The stand will take on the magnetism and render the magnetic interface's work imprecise. If you have magnetized the bows in the course of a performance, it is recommended to manually re-calibrate the interface right after you take the bows off the stand. And if you still prefer to hold them magnetized to the stand, place them as far (as low) from FLUX as possible.

CALIBRATING THE MAGNETIC INTERFACE

The FLUX's magnetic interface is a sensitive, finely tuned system, allowing to precisely locate the magnetic bows' placement. To achieve and maintain such high precision, we designed a special system of automatic and manual calibrations, allowing to tune the interface to varying conditions, such as temperature and weak magnetic fields surrounding FLUX — e.g. a residual magnetization emanated by a metallic stand holding your FLUX.

It takes some understanding on the user's side for the calibrations to work correctly.

There are three calibration types: a) automatic, at FLUX's power-on; b) automatic by a special algorithm starting during a pause in playing; c) manual, possible anytime by pressing sensors **V+A**.

ESSENTIAL POWER-ON CALIBRATION

For a successful calibration, before power-on, FLUX should be placed on a stand in the place where you are going to play, with all wires connected. In other words, FLUX should already be placed into the weak environmental magnetic fields in which it's going to be used.

Please note that the stand on which FLUX is placed is made of steel and has an amount of residual magnetization, often enough to influence the interface's operation. That's why FLUX should be calibrated in the very position, relative to the stand, in which you are going use it.

Turn FLUX on. An animation will show up on the screen — a line circling around the letter C (CALIBRATION).

While the animation's on, move the magnetic bows at least 0.5m/1.5ft away from the instrument. Calibration starts at the animation's end. In that moment FLUX will memorize the magnetic fields around it as the default state.

SECONDARY AUTOMATIC CALIBRATION IN-BETWEEN PLAY

It occurs in the background during pauses registered when the magnetic fields are lower than the "bows approximated" threshold (upper-screen corner dots off). If at least one dot is lit or blinking, no automatic calibration is performed. This calibration fine-tunes the interface to compensate for fluctuations that happen after FLUX's power on and which were not processed at the initial calibration. This secondary calibration is not indicated on the screen and is not observable by the user.

After FLUX's power on, it is recommended to not play it for 3-5 minutes and allow it to enter its stable mode. Within that period, the secondary calibration takes place to compensate for the fluctuations caused by the instrument's warming-up and entering its operational mode. If for some reason you need to start playing as soon as FLUX is turned on, do a manual calibration during your first pause.

MANUAL CALIBRATION

Engaged any time by simultaneously pressing sensors **V + A**. They are marked by two dots for an easy instant recall of the combination.

Pressing the sensors starts the animation — a line circling around letter C (CALIBRATION).

Within the animation time, move the magnetic bows at least 0.5m/1.5ft away from the instrument. The calibration starts as soon as the animation ends. In that moment FLUX will memorize the magnetic fields around it as the default state. The animation for the manual calibration is three times shorter than that for the initial automatic one, which allows for a very quick manual calibration. It can even be done in a short pause between notes by pressing the two sensors with your left thumb.

Manual calibration takes place regardless of whether a magnetic field exceeds the sensitivity threshold, so it's possible even with the screen corner dots on. Thus, the manual calibration can restore the interface to a working state even from a major imbalance when the secondary automatic calibration is not working.

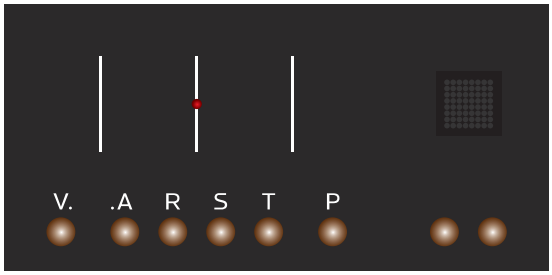
A manual calibration is advisable:

- If the upper corner dots (one or both magnet bows proximity indications) are lit despite the bows being significantly removed (30cm/1ft or more). That means that the default magnetic field is registered incorrectly and a calibration is required.
- If the Notes keyboard works imprecisely — e.g., on moving the bow away the note "slides" up or down. That means that a slight disbalancing induces an error locating the bow's position when it's moved away and the magnetic field decreases.
- "Just in case", in a pause when playing. However, if you stop playing the instrument and no upper corner dots are lit, the calibration will take place automatically every 30 seconds anyway.

If a manual or automatic calibration is done when the bows are near the instrument, the FLUX keyboard will become very disbalanced, which will lead to a constant "sticking" note the FLUX will return to whenever the bows are moved away. The upper corner dots will then be constantly lit, regardless of the bows' position. If that happens, just do a manual calibration, with bows moved 50 cm/1.5ft or farther away.

A slight disbalancing of the ***timbral area*** does not affect the performance unlike the ***notes area*** where it leads to pitch instability. Therefore, if you see no wrong behavior, you can leave it as is despite the left upper dot on the display indicating a magnetic field without a bow in close proximity.

CONTROL SENSORS AND SETTINGS



One of our aims designing FLUX was to use as few controls as possible, avoiding multi-layered menus and making all the functions easily accessible. To select a control parameter, eight touch sensors are used, as well as the Bow Flip. The parameter's value is set by the Notes keyboard, acting here as a big slider with minimum values on the left, maximum on the right.

This enables single-motion control for any FLUX parameter. Just touch one or two sensors and move the bow to a corresponding place on the Notes keyboard to set a parameter's value. That makes it easy to control parameters during your performance.

To change a chosen parameter, the bow should be placed 2cm/0.8in or closer to the FLUX.

To select a parameter with a flipped bow, the bow should be placed 7cm/2.7in or closer to FLUX's surface; to change the parameter selected, place it 2cm/0.8in or closer to the surface. To see the parameter's value without changing it — just place the flipped bow somewhere within 7 to 2 cm.

FLUX's interface has protection from accidentally changing a parameter — e.g. if you happen to touch a sensor during play. The sensors are blocked whenever the bows are near the interface. Thus, for the sensors to work, both bows should be moved far enough from it. For the left hand, that's at least 5cm/2in away from the sensors. For the right hand, at least 10cm/4in away from the keyboard's center line. The larger blocking zone is secured for the right-hand (Notes) area because it's more dangerous having a bow inside that zone with a sensor accidentally pressed, as that can lead to an unintentional parameter change.

It's easiest to press the sensors with your left thumb. That allows to still hold the bow with your left hand while moving it far enough from the keyboard.

If you have moved the FLUX bows far enough but the sensors are still not working, check that the upper corner dots that register the magnetic field are not lit. If they are, manually calibrate the interface by pressing **V+A**.

SENSOR V
(VOLUME)

Bow in Normal Position — volume control.
Holding down the **V** sensor, move the bow's white end to the keyboard (Normal Position) and control FLUX's output volume. The volume control is made using optocouplers, which, despite digital control, provides a full-analog quality, with the ability to memorize the master volume in the presets.

A basic rule for volume control: for maximum signal quality and lowest noise level, keep the volume level as high as possible. If equipment overloads further along the chain or the sound is too loud, it's better to decrease the input sensitivity on the equipment down the chain.

Bow in flipped position — DSP output level.
Holding down the **V** sensor, move the bow's black end (flipped position) towards the Notes keyboard to control the DSP's output signal. This is designed to control the output signal's digital clipping which occurs if the DSP signal goes over the maximum level the DAC can put out. Such overload results in loud notes sounding distorted and is indicated by two dots top-middle of the screen.

If these two dots light up during a performance, then you might want to lower the DSP's output. But distortion isn't always a problem: you can use that effect as an artistic device and intentionally overload the DAC; or, in some cases the distortion might simply be inaudible. The rule of the thumb is, keep your DSP output level as high as possible without distortion, or keep it within your artistic intention. The output level is indicated 0 to 99 on the screen, standard value 50. If you use FLUX in monophonic mode, the DSP can be increased to 70 or higher. If you use the polyphonic mode with long decays and long spatial effects, it's best to lower the output level, as such signals get summed and need more headroom.

This parameter can also be used to balance the presets' loudness, but still the rule is: keep the output level as high as possible. Decreasing the output level to 25 and below will start to degrade the DAC's output resolution and signal-to-noise ratio. That is why we've designed the two separate controls for seemingly the same function: the analog volume and the DSP output control. Bottom line: if you need to lower the instrument's master volume, use the volume control; to avoid the DAC clipping, use the DSP output control.

SENSOR A
(ALGORITHM)

Bow in Normal Position — selecting a synthesis algorithm.
FLUX's synthesis is organised as a set of synthesis algorithms, which allows a wide tonal palette while keeping the interface minimalistic. Every algorithm is a complete musical instrument. Up to 37 algorithms are available, each of them assigned to a note on the keyboard (37 notes, 37 algorithms). New algorithms will be gradually added via software updates. Every algorithm has its pictogram displayed. See the additional document "FLUX synthesis algorithms" for a detailed description of each algorithm.

Bow Flipped — selecting variation for the algorithm in use.
Every algorithm has several variations marked from A to H (8 variations max). See the additional document "FLUX synthesis algorithms" describing the variations and their number for each algorithm.
The variations are situated on the first notes of the first octave.

SENSOR R
(RELEASE)

C – COMMON

Bow in Normal Position — common release.
Controls the common release for all the notes played.

M – MONOPHONIC

At 0 value (bow hard left on the keyboard during control) FLUX works in monophonic mode. That mode is indicated by letter M.

At values above zero, FLUX works in polyphonic mode. The number of voices is set using sensor P (POLYPHONY) and the Flipped Bow position. Another voice will become available every time the bow crosses the sensitivity threshold of the Notes keyboard.

By holding down sensor **R** and pressing **T** (TYPE) you can select how the Notes keyboard responds to moving the magnet away in decay mode. There are two modes available - COMMON and LATCH, marked by letters C and L upper-right on the screen. In the C mode, the keyboard conveys all the dynamics and glissandi of your performance. But in case of an inaccurate (i.e. non-strictly-vertical) moving away of the bow from FLUX's surface, the note still in decay may "slide off".

In the L mode, on moving the bow away from the keyboard, the note's pitch is locked and stable even if your hand deflects. But that loses the minor glissandi you might play while going through silence from note to note. In the long run, it all depends on practicing your playing towards a state when you instinctively feel and use the features that the two modes offer.

P – PERCUSSIVE

Bow Flipped — the synthesis' percussive component's decay.
This envelope is controlled by the speed of the bow approaching FLUX's surface, i.e. reacts to quicker movement, and also triggers if the Notes keyboard is in PERCUSSIVE mode and when trigger threshold is crossed by the bow. At 0 value (all screen indication LED's off) the percussive component of the synthesis is turned off.
This envelope influences the synthesis differently depending on the algorithm.

SENSOR S
(SPATIAL)


R – REVERB


D – DELAY

Bow in Normal Position – controls the volume of the spatial effects. You can choose between two effect types – REVERB and DELAY. To select, hold down sensor **S** and press sensor **T** (TYPE). In DELAY mode, a blinking dot is displayed showing the current delay tempo. To tap the tempo, hold down sensor **S** and tap sensor **P** at least four times.


T – TIME

Bow flipped – control for the REVERB decay time and DELAY time interval. In DELAY mode, to tap in a delay time, hold down sensor S and touch the sensor P at least four times.

SENSOR T
(TRANSPOSE)

Bow Normal – transposing the keyboard a set number of octaves. The screen indicates the number of octaves that the keyboard is transposed. A transposition range of 0 to 6 octaves is available.

Bow Flipped – controls the octaves number for an additional transposition triggered by the flip of the bow. Allows to transpose the keyboard -4/+5 octaves additional to the set value. With this function in, there's a full six octaves immediately accessible.

SENSOR P
(PRESET, POLYPHONY)

Bow Normal – to select a preset to load or save.

To see which preset is currently loaded in, press **P** – a blinking number from 1 to 37 will show up on the screen. That's the current preset.

To load a preset: holding down **P**, select a desired preset by moving the bow to a corresponding zone of the keyboard. The selected preset will show up as number alternating with a pictogram of the algorithm used in the preset. If the preset is empty, a cross will appear instead of a pictogram. Release **P**. A successful preset loading is indicated by an "expanding square" animation. If a selected preset is empty, there's a static "cross" on the screen and nothing loaded.

To save a preset: holding down **P**, select a preset to save a current FLUX setting to by moving the bow to a corresponding zone on the keyboard. The selected preset will show up as a number alternating with a pictogram of the algorithm used in the preset. If the preset is empty, a cross will show up instead of a pictogram. Without releasing **P**, press **A**. A successful preset saving is indicated by an OK on the screen.

To save a preset including the current VOLUME value: holding down **P**, select a preset to save a current FLUX setting to by moving the bow to a corresponding zone on the keyboard. The selected preset will show up as number alternated by a pictogram of the algorithm used in the preset. If the preset is empty, a cross will show up instead of a pictogram. Without releasing **P**, press **V** (VOLUME). A successful preset saving is indicated by an OK on the screen.

A preset memorizes all FLUX's current settings except Master Tune. The Master Tune is a global setting for the whole synthesizer and all presets. Saving a preset including the VOLUME value allows to also set an output volume level for the instrument.

Presets are located corresponding with the notes on the FLUX keyboard. A total of 37 presets are available. You can easily memorize or write down a preset location using the note it's placed at — like, D2# for Preset 16.

Bow Flipped — sets the polyphony.
Marked by the "note" sign in left upper corner.

Can go from 1 to 12. The maximum polyphony depends on the current synthesis algorithm and is shown in the additional "FLUX synthesis algorithms" document.

This control is very useful in polyphonic mode with long release when sequentially playing the notes of the changing chords. E.g. by limiting the polyphony to three notes you can set the desired triad chord — the previous triad's note will automatically be replaced by the new triad's notes — by way of simply limiting the polyphony.

THE LEFT SENSOR "Q", UNDER THE SCREEN (QUANTIZE)

Pressing the sensor activates the note quantize function.
All the notes played will be pitch-quantized by standard chromatic scale. You can fine-tune the scale by the Master Tune function. A repeat pressing de-activates the function.

Holding down sensor "Q" + bow — quantize strength.
Holding down sensor **"Q"**, move the bow towards the Notes keyboard (bow side insignificant) and set the note quantization strength, indicated by a line on the screen. The longer the line, the stronger the quantization. Full line, as shown above, means 100%. A less-than-100% quantization strength leaves room for some narrow vibrato and subtle intonation.

Simultaneously pressing sensors "Q" and P + bow — allows to control sensitivity and response curve of the Timbres keyboard.

Value ranges from 00 to 99. The greater the number, the earlier and smoother comes the response. The less the number, the more audible the bow approximation effect, which is great for expressive playing.

Fine-tune this parameter to best fit the music played.

THE RIGHT SENSOR "P", UNDER THE SCREEN (PERCUSSION/PLUCKED)

Pressing the sensor engages the Percussion/Plucked mode.
It enables you to play sounds with sharp attack, usually heard from drums or plucked instruments. This is how it happens: over the FLUX's keyboard, at a distance from it, a virtual line appears: trigger threshold. Crossing it with a bow activates a sharp-attacked sound. The note's velocity is defined by the bow's speed when crossing the virtual line. That makes the playing in that mode akin to playing drums: you "hit" the bow on the virtual line, and the harder you do it, the louder and brighter the sound.

Holding down sensor "P" + Bow — setting the keyboard's sensitivity in the Percussive mode.
Holding down **sensor "P"**, move the bow towards the Notes keyboard (Bow side insignificant) and fine-tune the keyboard's sensitivity in Percussive mode, shown as a line on the screen. The longer the line, the higher the sensitivity, i.e. the higher is the virtual line over the keyboard, and the slower speed of the bow crossing the line triggers louder volume.

Simultaneously pressing sensor "P" and sensor P (the right sensor under the screen and the sensor marked **P**) **+ Bow Normal** — allows to control the sensitivity and the response curve of the Notes keyboard in Standard mode.

Values range from 00 to 99. The greater the number, the earlier and smoother comes the response. The lower the number, the more audible the bow approximation effect, which is great for expressive playing. Fine-tune this parameter to best fit the music played. When developing the instrument, we used the 70 value most often.

Simultaneously pressing sensor "P" and sensor P (the right sensor under the screen and the sensor marked **P**) **+ Bow Flipped** — allows to control the sensitivity of the Tilt function.

Marked by the "tilted line" sign in left upper corner. Values range from 0 to 9.

DUOPHONIC MODE

Simultaneously pressing sensors **"Q"** and **"P"** placed under the screen activates a two-voice mode for the Notes keyboard. A repeat pressing deactivates it.

In this mode you can play the Notes keyboard with two bows to make two-voiced parts — with an individual volume for each bow, as well as independent Bow Flips to switch octaves, comfortable for playing wide intervals of more than an octave or two.

The duophonic mode cannot work simultaneously with percussive mode! Engaging one of the two, disengages the other.

If you play the Duophonic mode with only one bow, a second note of random pitch will quietly sound along with the basic note you play. This has to do with specifics of the magnetic field always having several maximums, the weaker of which are in this case registered as a second note. So, to avoid those undesirable additional tones, the Duophonic requires playing with two bows. If you're going to play a monophonic melody, just turn off Duophonic mode.

The minimum interval between the bows at which they are reliably registered as two different notes is three semitones.

To play the Duophonic mode with a fixed timbre, use an external pedal in the "Timbres keyboard hold" mode (see the Pedal chapter below).

THE PEDAL

On the left side panel, there's an input for connecting a standard keyboard sustain pedal.

On power-up, the synthesizer scans the sustain pedal's status, and from then on sees that as "default/open". So, if a pedal is connected before turning the FLUX on, it will work correctly with either closed-by-default or open-by-default pedal — FLUX will automatically identify the type. If no pedal was plugged in during power-on, FLUX sees a pedal's initial status as "open".

The pedal can be assigned to either the Notes or the Timbres keyboard. To see which one the pedal is assigned to, hold down the pedal and press **sensor P** (PEDAL).

The assignment will show up on the screen. This symbol indicates that the pedal is assigned to the Timbres keyboard. When the pedal is pressed, FLUX memorizes the status of the Timbres keyboard and holds it locked for as long as the pedal is pressed. All further bow manipulations are then added to the values being held by the pedal.

This function may be used as follows:

1. To memorize a timbre dialed-in on the Timbres keyboard and free up the left hand — e.g. for playing in Duophonic mode.
2. To create complex multi-polar magnetic fields that are impossible to create with one bow. To do that, create a first part of the magnetic field. Memorize it using the Pedal, and then create a second part of the magnetic field by shifting or flipping the bow. In some algorithms this allows to create tones unobtainable with just one bow. That is particularly relevant for complex configurations of Timbres keyboard sensors — such as six-polar, or three YZ-pairs. In case of using the sensors as one big XYZ-controller, however, such manipulation makes little sense.

This symbol indicates that the Pedal is assigned to the Notes keyboard. On pressing the pedal, an alternative mode for the Notes keyboard turns on, giving a different type of sound extraction. With the keyboard in Standard mode, a Staccato mode turns on, in which the note only lasts as long as the bow moves up, which allows to play staccato notes. With the keyboard in Percussive mode, a Standard legato mode turns on. Thus, using the Pedal allows you to go legato or staccato at any moment.

The Staccato mode also works great with Main Decay turned on. That makes for a softer sound than the Percussive mode.

To switch between Pedal modes, press the pedal, hold down sensor **P** (PEDAL) and press sensor **T** (TYPE). Every touch on sensor **T** will change the mode, which will be indicated on the screen.

MUTING DECAYING NOTES

Simultaneously press sensors **R** and **S**. The notes in decay will go silent, as if Main Decay and FX feedback were set to zero. On releasing the sensors, the decay and feedback will return to its previous state. This function allows to interrupt longer notes if necessary. Or to go to staccato notes for a while, without switching the mode.

NOTES KEYBOARD MASTER TUNE

Press sensors **A** and **T** simultaneously. The A note sounds and the current master tuning shows up on the screen.

This symbol indicates that the keyboard is now tuned to standard: A=440Hz. By moving the bow along the Notes keyboard, you can change the tuning within +/- a semitone in one cent steps. The tuning will be indicated by numbers within -/+ 99 interval.

The master tuning is global for all algorithms and presets and is not stored to presets.

LOCKING THE CONTROL/SETTINGS SENSORS

To avoid accidentally activating a control/setting function during performance, FLUX has an option for locking the touch sensors. To lock the sensors, simultaneously press the two sensors under the screen and the sensor **V**. A symbol will show up on the screen:

That means that the sensors are locked. In that mode no accidental touches can activate any of the functions. And you can easily put your left hand on FLUX's housing. To unlock the sensors, press the two sensors under the screen and the sensor **V** simultaneously again. The blocking symbol will disappear from the screen.

With the sensors locked, the **V+A** manual calibration of the magnetic interface doesn't work either!

To start a manual calibration, you have to first unblock the sensors.

LEFT-HANDED MODE

Holding both sensors under the display and **P** shows in which mode FLUX is. R on the display means right-handed (default), L on the display means left-handed mode. To switch between the modes, holding the sensors, press **R** (REVERSE). In the left-handed mode, the Notes keyboard becomes left-right flipped and the Timbral keyboard bottom-up flipped. Now just flip the FLUX and that's it!

UPDATING THE SOFTWARE

Download the latest FLUX software version from https://somasynths.com/flux_firmware and place it into the root folder of a USB stick drive (FAT32 file system required!). We don't recommend using big capacity USB drives—1 to 32 Gb is perfect. Don't put several versions of the software into the root directory!

Insert the stick drive into the USB-port of the powered-off FLUX and turn it on. FLUX will automatically go to the USB drive operation mode.

If the USB stick drive is damaged or incompatible with FLUX, a 'cross' sign will show up.

In such case, turn FLUX off and replace the USB stick drive.

UPDATE?

If there is FLUX software found in the root directory, an update procedure will be proposed, with the following sign on the screen.

Press sensor **A** to start the update process, indicated by an animation on the screen.

On completing the update, an "OK" will show up.

Remove the stick drive, and FLUX will go to its standard work mode. Enjoy the updated synth!

If an error occurs during the update, a 'cross' sign will show up.

In that case, turn FLUX off, then back on, and re-attempt the update procedure. Try downloading the software update file again. Try another USB stick drive.

If you don't want to update the software, and want to use a USB stick for loading or saving the presets, press any sensor except **A**. A symbol will show up on the screen to indicate that FLUX is now in the USB drive work mode.

You can also go to that mode after the software update completes and the OK sign shows up, by pressing any sensor.

- Whenever the USB stick is inserted, the synth goes into the USB drive work mode and playing is not possible. To return to the standard work mode, remove the USB stick.
- If you don't want to update the software or work with presets, just remove the USB stick and FLUX goes to its standard work mode.
- Don't turn off FLUX during update! That can render the software loaded unworkable.

SAVING AND LOADING PRESETS USING A USB DRIVE

You can save user-created presets to a USB drive and load them back into FLUX. They are saved as presets 1-37 in a single bank. You can have up to 10 preset banks on one USB drive.

Insert the USB drive into the USB-port of a powered-off FLUX and turn it on.

If the USB drive is damaged or incompatible with FLUX, a 'cross' sign will show up on the screen.

In such case, turn FLUX off and replace the USB stick.

If the USB stick is good, FLUX will go into the USB drive work mode and a "USB Drive" sign will show up on the screen.

SAVING PRESETS TO A USB DRIVE

Press and hold sensor **S** (SAVE) and by pressing the sensors under the screen (left for "minus", right for "plus") select the bank number to save the presets to.

FREE

OCCUPIED

The selected bank number will show up on the screen. If that bank is occupied, a line will show up above the number.

Saving presets to an occupied bank will delete the presets previously stored in it!

With the sensor **S** still held down, press sensor **A**. The bank will be saved and the "OK" sign will show up on the screen.

Press any sensor and FLUX will return to its initial USB drive work mode.

If an error occurs during the saving, a "cross" sign will show up on the screen.

In such case, press any sensor and FLUX will return to its initial USB drive work mode.

If you no longer want to save the presets, just release the sensor S.

On completion of your USB work, remove the USB drive stick and FLUX will go to its normal work mode.

Every preset bank is saved to the flash drive in form of a separate file with a corresponding number. A bank is registered as occupied if such a file already exists on the USB drive.

LOADING PRESETS INTO FLUX

Press and hold sensor **P** (PRESET) and by pressing the sensors under the screen (left for minus", right for "plus") select the bank number to load in. The screen will show the bank number selected. Only loadable banks are shown, i.e. those previously created by you.

Loading the preset bank will delete the presets previously stored in FLUX!

Still holding down the sensor **P**, press sensor **A**.

The bank will be loaded and an "OK" sign will show up on the screen. Press any sensor, and FLUX will return to its initial USB drive work mode.

If an error occurs during loading, a "cross" sign will show up on the screen. Press any sensor, and FLUX will return to its initial USB drive work mode.

If you don't want to load the presets anymore, just release the sensor **P**.

When finished, remove the USB stick and FLUX will go to its standard work mode.

In case of accidentally deleted factory presets, these can always be downloaded from our website.

BATTERY

FLUX has a Lithium battery for storing data during power-off. That allows saving FLUX's previous settings, so that on the next power-on you'll find the instrument set the way it was before the power-off.

The memory-backup batteries last very long — years, in fact — but still, at a certain point they do run down and need replacement.

If during FLUX's power-on a blinking battery symbol shows up then it's time to replace it.

A high-quality 3-Volt Lithium battery is required, type CR2032. To replace the battery, turn FLUX off, disconnect it from all wires and connections, unscrew its bottom cover and replace the battery. The battery is placed near the screen, on the same side as the sensors.

If the battery has run down and the FLUX status data is lost, the first preset will be loaded on power-up, with the master tune set to zero. The presets, the software etc., will not be lost. The battery run down is not a serious problem; only the current settings, if not saved to a preset, will be lost.

CALIBRATING THE OPTOCOUPLERS

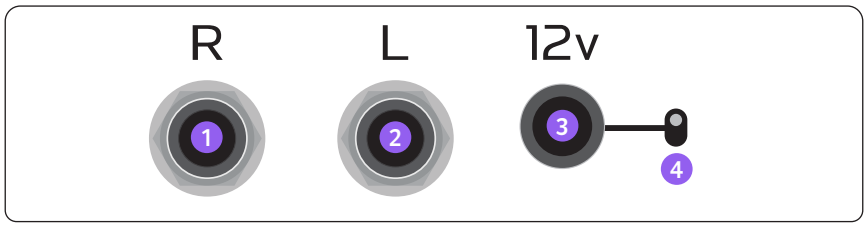
The FLUX volume control is made using optocouplers. That preserves the best sound quality identical to a mechanical variable resistor — but with digital control. To keep the left and right channels balanced, the optocouplers are calibrated at the factory. As optocouplers may slightly change their properties with time, we recommend re-calibrating them once every 2-3 years.

To do that, visit the site https://somasynths.com/flux_firmware/ and download the file optocoupler_calibration. Place the file into the USB drive's root directory.

Turn FLUX off and disconnect everything from the headphone and audio outputs. Insert the USB drive stick with the file and turn FLUX on. The calibration procedure will start automatically, indicated by "CL" sign on the screen. On completing the calibration, the "OK" sign will show up. Remove the USB drive, and FLUX will return to its normal mode.

CONNECTIONS

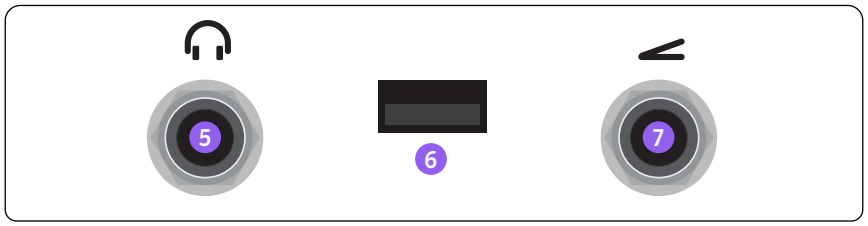
LEFT PANEL



1. **Right channel output.**
2. **Left channel output.**
3. **Power input:** DC12 V 0.4 A, 2.1mm jack, "+" in the center.
4. **Power-on switch**.

If only one jack is connected, to any output, the signal goes mono automatically. The headphone output signal then goes mono as well. Thus any one of the L R outputs can be used as mono output.

RIGHT PANEL



5. Headphone output
6. USB port (TYPE A)
7. Pedal

SPECIFICATIONS

Notes keyboard	37 notes
Musical range	9 octaves
Maximum number of synthesis algorithms	37
Polyphony	1-12 (depending on the algorithm)
Number of presets	37
Line output	L, R TS / TRS 1/4 inch jacks
Maximum line output signal	18 V Peak-to-peak
Nominal line output signal	~5 V (Volume %100)
Headphones output	TRS 1/4 inch jack
Headphones resistance	6–64 Ohm
Power voltage	DC 12 V *
Power consumption	0.4 A
DC JACK	2.1 mm, "+" in the center
Dimensions	1000 x 114 x 30 mm
Weight	1.7 kg

* FLUX comes with a high-quality power supply unit. If it's lost, use a high-quality modern switching power supply unit with 100-240V input voltage and 12V output voltage, with at least 0.5 A output power, 2.1 mm DC jack, "+" in the center.

PACKAGE CONTENTS:

FLUX — 1 pc
Power supply — 1 pc
Magnetic bows — 4 pcs
A short interface manual — 1pc

ALSO AVAILABLE FOR PURCHASE:

Stand mounting adapter
Soft bag
Hardshell case
Additional set of magnetic bows

CREATED BY:

Andrzej Slovik — production organizing and control
Valeriy Zaveriayev — user manual design and layout
Viktor Grigoriev — mechanical assembly
Vitaly Zhidikov — sales, management
Vlad Kreimer — concept, interface, sonic design, visual design, schematics, construction, programming, DSP, audio, video, performance
Vladimir Kornienko — English translation for the user manual
Vyacheslav Grigoriev — supply and production
Grzegorz Lacek — organization, marketing, advertisement, sales, management and communication
Dmitry Zakharov — setup and control
Yevgeni Aleynik — legal support
Małgorzata Marcinowska — CEO
Marta Lacek — communications and sales
Maxim Manakov — experiments, programming, printed circuit-board design, constructing, obtaining sacred artifacts
Regina Volkova — management, communications, website, user manual editor
Runa Kreimer — design drawing, technology search and proof-running
Thomas Lundberg — communication, utopian linguist, proofreader.

www.somasynths.com
Vlad Kreimer, 2024

Manual version 1.0

2024. Designed in Russia