THE BumBleBee (aka The 3B)

User manual may 2025

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" Your hands create the sound . Every gesture becomes emotion ,
every movement , a new sonic landscape »,

The 3B is a standalone hybrid instrument, combining two powerful audio engines with two high-precision 3D sensors, designed as both a unique instrument and a spectacular controller for modular systems and MIDI synthesizers.

Welcome to the world of **The BumBleBee** , aka **The 3B** .

I.   Architecture

The 3B consists of a **24HP** Eurorack control panel and an **8HP** sensor module. The sensor module can be fixed to a support placed on a table, scratched to the back of a Eurorack case , or mounted on a gooseneck. When the sensor is not near the module, a flat cable allows it to be connected via the socket on the front. If the sensor is integrated in Eurorack format, the internal connection via specific cable allows mounting without visible cables.


An optional self-powered external box is available to make the unit completely autonomous. It adds MIDI DIN out, USB MIDI In/Out, and a microSD card port .
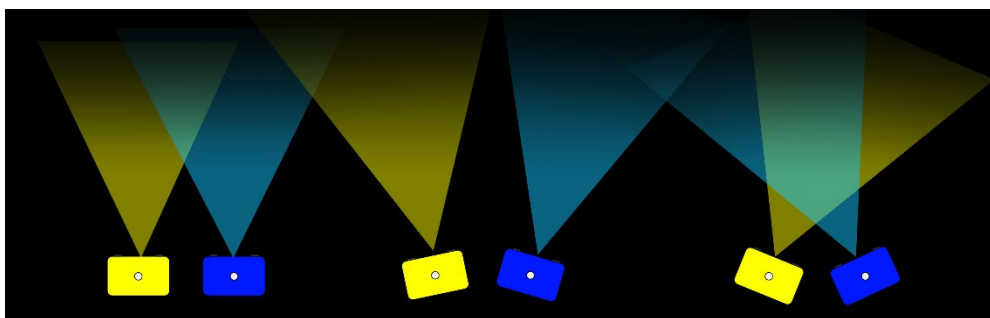
II. The sensor module

On the left (**yellow** adjustable support) is a **3D Laser/IR**, completely safe for fingers and eyes, it is a specific technology called **TOF** (Time Of Flight). This sensor transmits an image of your hand or any other object that enters its cone of vision, along with the precise distance between the object and the sensor. The image allows, by analysis, to determine the **X** and **Y** position of the hand or the object. The **Z** height is transmitted directly by the sensor with **millimeter precision**.
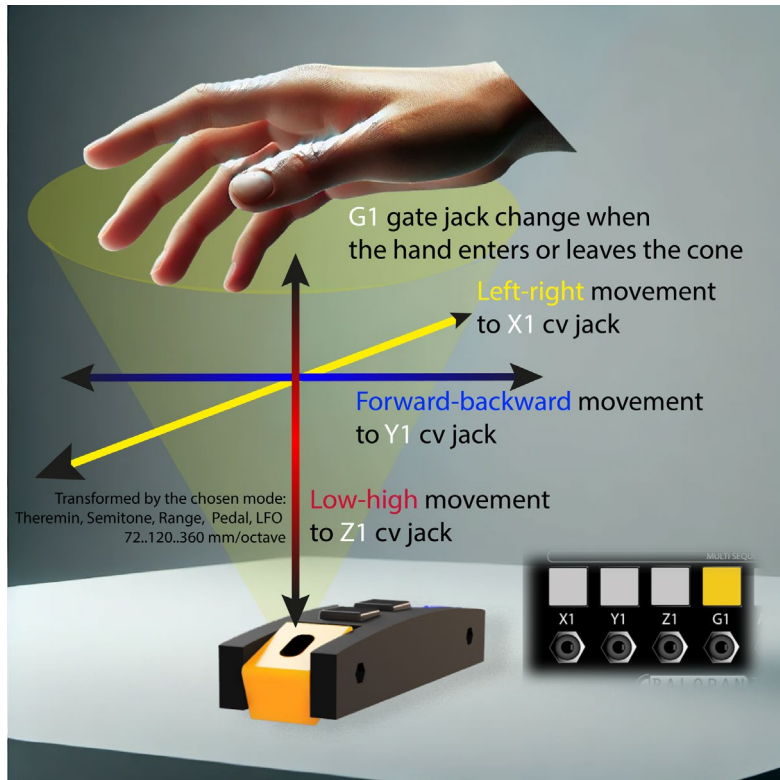
A second identical sensor, placed on the right (**blue** adjustable support), transmits the coordinates **X2**, **Y2**, **Z2** as well as a GATE **G2**, allowing completely independent two-handed play.

In the center, **two buttons A** and **B** are very sensitive **pressure** sensors. They transform pressure into voltage available on sockets **A/X2** and **B/Y2**. They can operate as two independent sources or as a single source controlled by both knobs: in this case, **button A** decrements the value, **B** increments it and both can act simultaneously to allow excellent fineness of control.

Both sensors are **pivotable**. Press each hinged bracket to tilt the sensitivity cone in either direction. By making the cones converge, you create a common zone that allows both channels to be controlled with a single hand. By moving the cones apart, you increase the independence of both hands.

III.   Installation

If you purchased the **BOX version**, **The 3B** is already fully assembled. Simply connect the external power supply. Otherwise, choose a suitable location for the **24HP control** module and the **8HP sensor** module, then proceed with the connections as described below.
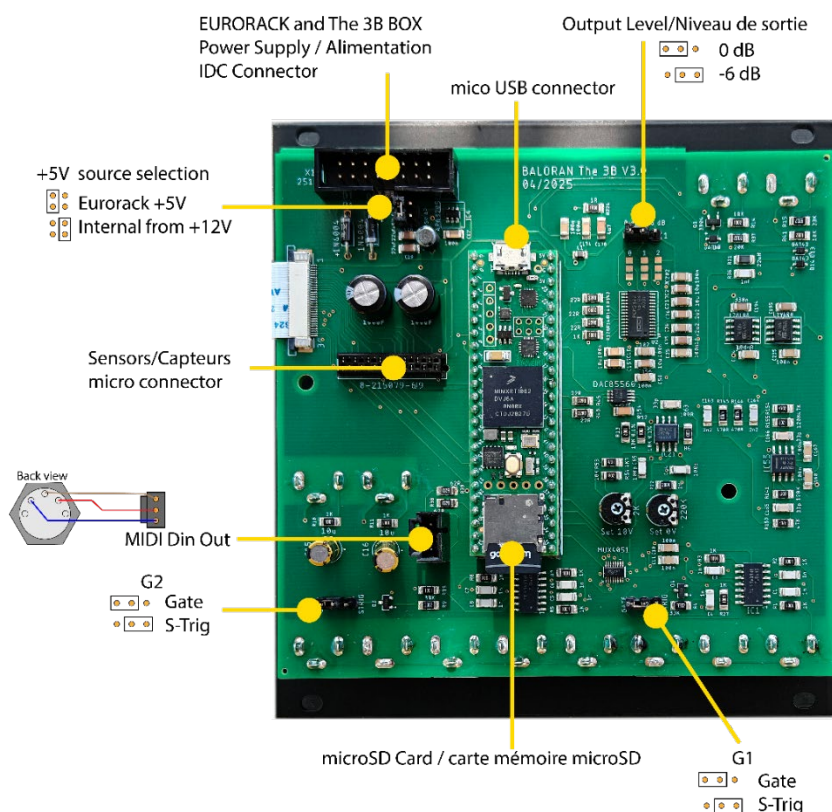
The 3B Power Consumption

In Eurorack +5V mode:
-12V = 6mA max
+12V = 6mA max
+5V = 380mA max

In +5V derived from +12V mode:
-12V = 6mA max
+12V = 210mA max
+5V = 0mA max

If your Eurorack case provides a **+5V** supply, set the power selection jumper to *Eurorack 5V* and use the included **16-pin to 16-pin IDC** ribbon cable. Do not use the cable with the micro connector for this configuration.

If your Eurorack case does **not** supply **+5V**, set the jumper to *Internal from +12V* and use the included **10-pin to 16-pin IDC** ribbon cable. In this case, The 3B will draw 200mA from the +12V rail and convert it to +5V internally.

The sensor block is preconfigured for internal wiring. Simply connect the ribbon cable from the sensor block to the sensor micro connector. **Pay attention to orientation**: a small (and fragile) notch will indicate the correct direction.

If you prefer to install the sensor as a mobile unit, use the ribbon cable with both a micro connector and a 16-pin IDC connector. A step-by-step tutorial for this modification is available on the Baloran forum.

To update **The 3B's firmware**, all necessary instructions are available on the Baloran forum.

IV.   Height information management (Z1 and Z2).

The **height** of the hand, another part of the body, or an object relative to the sensor is fundamental information and **The 3B** offers you several ways to manage it.

SENSOR 1
AID
OFF
FUNCTION
LIKE THEREMIN
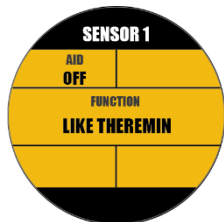
LIKE THEREMIN mode
When the hand enters the sensor's visibility cone, the **GATE** is activated. The tension available on Z will correspond to the height of your hand. By default, The3B offers **120mm** per octave. With its sensitivity, in broad daylight and without gloves, you cover three octaves minimum . You can change this reference by 120mm per octave (possible values 72, 96, 120, 180, 240 and 360 mm). **AID** adjusts **pitch assistance** to help play more in tune.

SENSOR 1
STEP | NOTE
C | ON
FUNCTION
SELECTED SEMITONE
PRESET
Custom
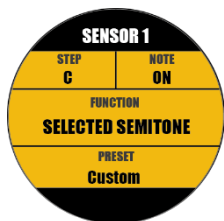
SELECTED SEMITONE mode
Each **10 mm** of movement (with 120 mm/octave adjustment) corresponds to a **semitone** . The **GATE** in this mode is generated for each note played. You can enable/disable certain semitones to limit the scale to a specific key or notes.

SENSOR 1
STEP | NOTE
4 | Eb0 (3)
FUNCTION
RANGE NOTE
STEP/OCT | IMPORT
4 | Custom
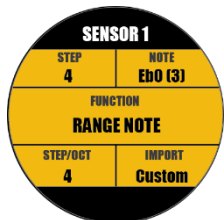
RANGE NOTE mode
It's up to you to decide how to manage the **height**. Set the **number of intervals** per octave and **assign a note** to each interval. Example: divide the 120mm into four 30mm zones and assign each interval the notes **C-1**, **C**, **G-1**, **G+1.** In the first 120mm, he will therefore play **C1**, **C2**, **G1**, **G3**, in the following 120mm **C2**, **C3**, **G2**, **G4** and so on.
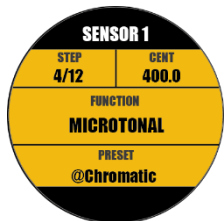
SENSOR 1
STEP | CENT
4/12 | 400.0
FUNCTION
MICROTONAL
PRESET
@Chromatic

MICROTONAL mode
The 3B reads **SCALA** files. It comes with some files on its **microSD** by default . Select a **microtonal** scale , The **3B** will adapt the tensions to match the pitches of the tones defined in the SCALA file. You will be able to play baroque with 12-tone scales but also in more exotic scales from 2 to 24 tones.

SENSOR 1
SD SEQUENCE | ORDER
QuinOct | UP
FUNCTION
MULTI SEQ
REVERSE | DIVIDE
No | 1/8
200
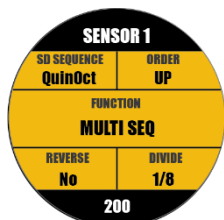
MULTI SEQ mode
It's a bit like **RANGE NOTE** mode. Set the **number of intervals** per octave but instead of assigning a note to a position, you will **assign a sequence** of 2 to 24 steps to each interval. This allows you to prepare **arpeggios** in the key of your choice, each pitch will play the sequence adapted to the key thus avoiding the simple transposition of a classical sequence.
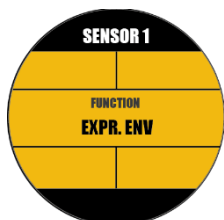
SENSOR 1
FUNCTION
EXPR. ENV

EXPR ENV mode
In this mode, the sensor acts like an **expression pedal.** Above 200mm nothing happens. Below, bringing your hand closer to the sensor acts as if you were pressing a volume pedal, the voltage emitted on **Z** will increase. **X** and **Y** information are transmitted normally.
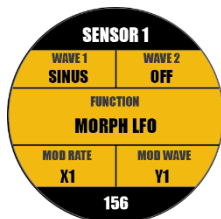
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MORPH LFO mode

Each sensor manages an **LFO**. The **LFO** signal is found on jack **Z**. We can define **two waveforms** and indicate what information is used to move from one waveform to the other. The **height** of your hand will define the **amplitude** of the modulation, **X** and **Y** can be assigned or not to the **morphing** of the wave and/or to the modulation **speed**. This module handles **classic waveforms** as well as **custom waveforms** that you can edit with the **WaveEdit** application .
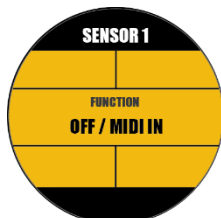
Mode **OFF / MIDI IN**

In this mode, the **sensor is deactivated**. No **X**, **Y**, **Z** or **G** information is generated. If **MIDI messages** arrive at the **USB** socket and the **MIDI channel** corresponds to the sensor (**1** or **2**), the main **MIDI information** can be **converted into voltage**: velocity, aftertouch, modulation, bend, volume and note.

This makes The 3B an excellent **MIDI / CVs+GATE interface** for every sensor.

V.   Audio engines

For each sensor, **The 3B** features a **high-quality 16-bit 96K** digital audio generator. The oscillators offer **classic waveforms** (both fixed and variable), **wavetables**, and a **Karplus-Strong physical modeling** generator. Each engine also includes a **sub-oscillator**, a **multimode filter** (Moog 24dB or OTA 12dB/octave, LP, BP, HP), and an **ADSR** envelope.

The audio signal linked to the **yellow sensor** is available on the **OUT 1 jack**, that linked to the **blue sensor** on **OUT 2**.
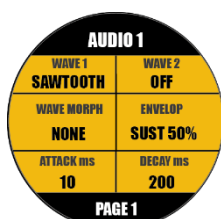
The **Z** pitch transmitted by the sensor changes the **pitch** of the sound. **Morphing** between **two waves** from the same table or from several tables, the **frequency** and **amplitude** of each generator can be **modulated** by **information** from sensors, **buttons** or the **CV In input.**

The **wavetables** are saved on the **microSD** and editable with the **WaveEdit** application .
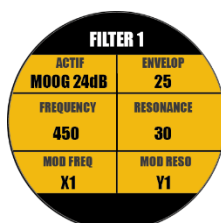
These generators are **4-voice polyphonic**. They receive monophonic information from the sensor but this helps avoid abrupt transitions when changing pitch: with release, you notice that the last note played is not cut off when a new note is played.

The **filter frequency** and **resonance** can be **modulated** by **information** from sensors, **buttons** or the **CV In** input**.**

VI. Sequencer
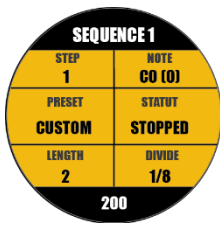
Each sensor has its own **sequencer**. It is active for **SELECTED** modes **SEMINOTE** , **RANGE NOTE** and **MICROTONAL** . The sequencer allows you to create a pattern that will be transposed by the pitch of the note generated by the defined mode. The sequences on microtonal scales are quite exciting.

This screen allows you to directly modify the steps of the sequence, the time division relative to the global tempo and the playback mode. Complex **rhythms** can be created by inserting **silent** steps.

The s**equence models** (presets) are defined in a **text file** on the **microSD** , customizable as desired.

VII. I/O and hardware options

On the back of the module, for each **GATE jack**, a **jumper** allows you to choose between a **classic GATE** output (0V..Selected voltage) or **S-Trig** (open collector).

A third **jumper** allows you to choose between powering the module with **+12V -12V** or **+12 -12V and +5V**. The **+5V** option is recommended to avoid an additional **300mA** load on the **+12V** rail .

A fourth **jumper** selects the **audio output level**: **+-2V** or **+-4V**.
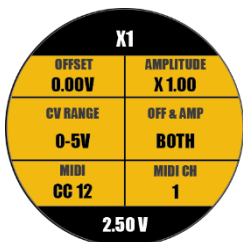
For **each CV output**, a **dedicated button** and **screen** allow you to quickly configure the output, **0.. 5V**, **0.. 8V**, **+-5V** as well as an **offset** and an **amplitude** coefficient. The voltage available on the jack is displayed in real time. You can thus adapt each CV information to the connected module.

The 3B integrates a **CV input** and a **Gate input** . This allows you to synchronize your module with an external sequencer/BAR/TB/DAW via the **Gate In** and receive voltage information that can transpose the notes and sequences played by the module. The **CV input** can also be used to modulate an internal LFO parameter or to morph between wavetables of digital generators.

A **sustain pedal** can be connected to the **Gate input**. In this case, you can choose whether the pedal activates the **pause** or the **sequencer**.

CALIBRATION function allows you to adjust the **Z1** and **Z2 voltages so that your oscillators meet the** microtonality requirements proposed by **The 3B** and play in tune over several octaves in concert with the audio generators.

VIII.   Midi controller

The 3B is also a **fantastic MIDI** controller, capable of controlling both vintage and modern synths thanks to its complete compatibility. Each sensor will output either **On/Off notes** , **CC** (Control Change), **MPE** information, or **bends** to allow almost any synthesizer to take full advantage of all of **The 3B's** modes. Any synthesizer can even do **LIKE THEREMIN** provided it supports a **bend** of ±12 or ±24 semitones.

Every synthesizer can also access **microtonal** scales , with some restrictions on polyphony if you're not in MPE.

The 3B is **MPE compatible** and can therefore generate an **MPE stream** , with your hand movements replacing gestures on your **MPE keyboard** .

MIDI data is output on the D **IN OUT socket** and/or the **USB socket** available on the external box. Without an external box, the necessary cables can be purchased to allow you to have a personalized installation.

The **USB** socket operates as **MIDI IN** and processes incoming **NOTE ON/OFF** messages as well as the **main modulations**.

If you select **OFF / MIDI IN** mode for **sensor 1**, **NOTE ON/OFF messages** received on **channel 1** will activate **audio generator 1** and optionally jacks **X1**, **Y1**, **Z1** and **G1**, with **MIDI CC mapping to these jacks**.

If you select **OFF / MIDI IN** mode for **sensor 2**, **NOTE ON/OFF** messages received on **channel 2** will activate **audio generator 2** and optionally jacks **X2, Y2**, **Z2** and **G2,** with **MIDI CC mapping to these jacks**.

The 3B thus becomes a remarkable **MIDI / CVs+GATE interface**, and possibly a double one!

In modes other than **OFF / MIDI IN**, only **NOTE ON/OFF** messages received are processed : modulations will be those coming from the **sensors** (**X**, **Y**, **ENV**, **BTN**, **EXPR. ENV** and **MORPH LFO**). You can then play notes on a keyboard or send a MIDI stream recorded on a DAW, while modulating Wavetables and/or filters with your hand(s).

The sound engine is 6-voice polyphonic for each channel, with the filter and filter envelope shared by the voices of a channel.

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IX. Functioning

The 3B interface is designed to be straightforward and efficient. Five encoders (**E1** to **E5**) surround the main screen, accompanied by **14 direct access buttons**. **No submenus**: each button displays a dedicated page where the encoders become active immediately.
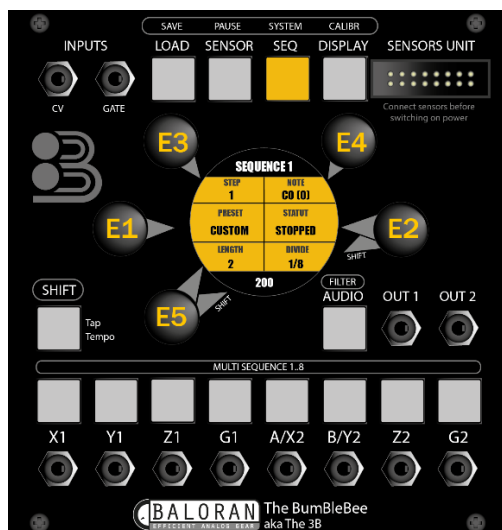

Example: after pressing the **SEQ button** , the parameters of the sequencer linked to sensor 1 can be modified as follows:

- **E1** selects a **Preset**
- **E2** changes the **Status** of the sequence
- **SHIFT** + **E2** changes **division**
- **E3** Changes the current **step**
- **E4** Changes the **note played** for the current step
- **E5** Changes the **length** of the sequence
- **SHIFT** + **E5** changes the **Tempo**

! *Note the names of the encoders **E1** to **E5**. They will be used throughout this document. Another important rule is that settings that affect **sensor 1** are always displayed on a **yellow** background. For **sensor 2**, the background is **blue**. The illuminated buttons follow this rule: they are illuminated yellow for sensor 1, blue for sensor 2.*

SENSOR , **SEQ** , **DISPLAY** and **AUDIO** buttons provide access to the settings of the two sensors
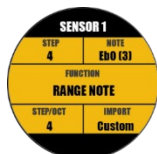
First press on **SENSOR** = Yellow background, choice of operating mode for yellow sensor 1.Choosing OFF disables the sensor. The **SENSOR** button is illuminated in yellow.
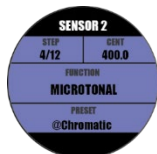
Second press on **SENSOR** = Blue background, choice of operating mode for blue sensor 2. The **SENSOR** button is illuminated in blue.

Third press, you return to sensor 1 and so on…

Some screens are accessible by pressing the **SHIFT button** simultaneously with another button. When a **SHIFT** is available, the function is indicated in a box above the button.

SHIFT + LOAD	SAVE
SHIFT + SENSOR	BREAK
SHIFT + SEQ	SYSTEM
SHIFT + DISPLAY	CALIBRATION
SHIFT + AUDIO	FILTER
SHIFT + JACK	Selecting a sequence (1..8) in MULTI SEQ mode.

Shift is active as long as the button is **flashing rapidly**. This saves you having to use two presses simultaneously, or pressing **Shift** while turning an encoder.

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X.   References

- ## Mode OFF / MIDI IN
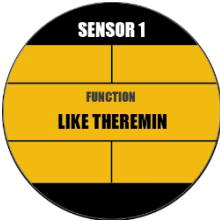
In this mode, the **sensor is deactivated**. No **X**, **Y**, **Z** or **G** information is generated, and no notes are played or **transmitted via MIDI**. **Only MIDI IN** streams entering the **USB** socket are managed. The **MIDI channel** determines the group of jacks assigned:

channel 1	jacks **X1**, **Y1**, **Z1** and **G1**
channel 2	jacks **X2**, **Y2**, **Z2** and **G2**

The **MIDI IN** parameter on the jacks screen indicates which **MIDI** parameter will be converted to the voltage available on the socket.

|	
NONE	No conversion
VELO.	Velocity of the note played
AFTER.	Channel or polyphonic aftertouch
WHEEL	Modulation wheel (MIDI CC 1)
BEND	Bend/pitch wheel
VOLUME	MIDI CC 7

- ## LIKE THEREMIN mode
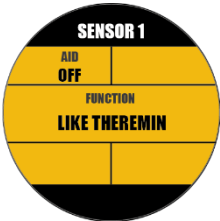
When the hand enters the sensor's visibility cone, the sensor gate is activated. The tension available on **Z** will correspond to the **height** of your hand. By default, The3B offers **120mm** per octave. With its sensitivity, in broad daylight and without gloves, you cover three octaves minimum. You can modify this reference by 120mm per octave (possible values 72, 96, 120, 180, 240 and 360 mm) see SYSTEM

AID adjusts **pitch assistance** to help play more in tune : **OFF** = no assistance, **MAX** = the nearest half-tone is played.

SENSOR button once or twice to select the sensor and then select this mode with the **E1 encoder** .

- ## SELECTED SEMITONE mode

By default, with a setting of **120mm** per octave, if you move your hand **10mm**, the next or previous **semitone** will be played. The **GATE** in this mode is turned on/off for each note played. You can **enable/disable** semitones of your choice, for example to allow only the "white" notes to be played or just the notes of a chosen key.
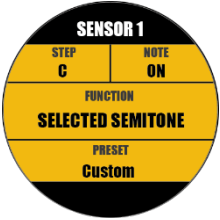
SENSOR button once or twice to select the sensor and then select this mode with the **E1 encoder** .**STEP** is automatically selected by the **Z** of the sensor.

STEP	E3	Selecting one of the twelve semitones of the scale
NOTE	E4	Choose whether the selected semitone is played or not.

FUNCTION	E1, E2	Selecting the sensor Z management mode
PRESET	E5	Apply a preset

• RANGE NOTE mode

In this mode, set the **number of intervals** per octave and **assign** each interval **a note** relative to the Z pitch returned by the sensor. Example: divide the 120mm into four 30mm zones, and assign the notes **C-1**, **C**, **G-1**, **G+1**. In the first 120mm, this mode will therefore play **C1**, **C2**, **G1**, **G3**, in the following 120mm **C2**, **C3**, **G2**, **G4** and so on.

SENSOR button once or twice to select the sensor and then select this mode with the **E1 encoder** . **STEP** is automatically selected by the **Z** of the sensor.
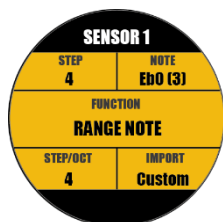
STEP	E3	Selecting one of the created intervals
NOTE	E4	Selection of the note played for this interval. It is expressed in + or – 24 semitones relative to the Z height of the sensor.
FUNCTION	E1, E2	Selecting the sensor Z management mode
STEP/OCT	E5	Sets the number of intervals per octave.
IMPORT	SHIFT+E2	Import a setting

• Microtonal mode

The 3B reads SCALA files. It comes with some files on its **microSD** by default. Select a **microtonal** scale , **The 3B** will adapt the voltages and audio generators to the pitches of the tones defined in the SCALA file. You will be able to play baroque with 12-tone scales but also in more exotic scales from 2 to 24 tones.

SENSOR button once or twice to select the sensor and then select this mode with the **E1 encoder** . **STEP** is automatically selected by the **Z** of the sensor.
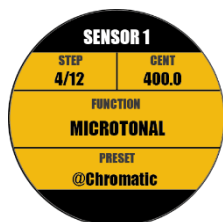
|		
STEP	E3	Selecting one of the tones from the SCALA range
HUNDRED	E4	Adjust the pitch of the selected tone in cents.
FUNCTION	E1, E2	Selecting the sensor Z management mode
PRESET	E5	Selecting a SCALA file from the micro SD

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• MULTI SEQ mode

Set the **number of intervals** per octave and set a **sequence** of 2 to 24 steps for **each interval** . This allows you, for example, to prepare arpeggios in the key of your choice; each pitch will play the sequence adapted to the key and not a simple transposition.

SENSOR button once or twice to select the sensor and then select this mode with the **E1 encoder** . To access the settings for each sequence, press **SHIFT** and one of the buttons from **X1** to **G2** .
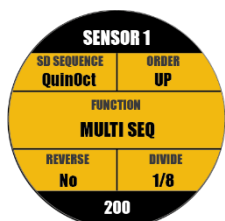
SD SEQUENCE	E3	Select one MULTI SEQ from the micro SD.
ORDER	E4	Set the playback mode of sequence steps.
FUNCTION	E1, E2	Selecting the sensor Z management mode
REVERSE	E5	Cause inversions for the higher octaves
DIVIDE	SHIFT+E2	Time division relative to the overall tempo
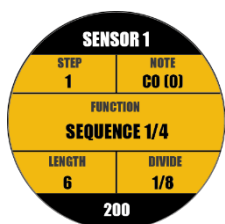
| STEP	E3	Selecting one of the steps in the sequence
NOTE	E4	Select the note played for this step. This note is expressed in + or – 24 semitones relative to the Z height of the sensor. Off causes silence
FUNCTION	E1	Multi SEQ Sequence Selection
FUNCTION	E2	Defines the number of intervals per octave, therefore the number of sequences of the Multi SEQ (1.. 12)
LENGTH	E5	Number of steps in the sequence (1.. 24)
DIVIDE	SHIFT +E2	Time division relative to the overall tempo

• EXPR ENV mode
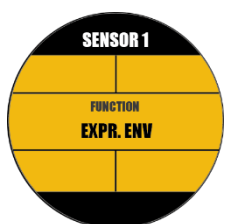
In this mode, the sensor acts like an **expression pedal**. Above 200mm nothing happens. Below, bringing your hand closer to the sensor acts as if you were pressing the volume pedal, the voltage emitted on **Z** increases.

X and **Y** information are transmitted normally.

SENSOR button once or twice to select the sensor and then select this mode with the **E1 encoder** .

• MORPH LFO mode

Each sensor manages an **LFO** . The **LFO** signal is found on jack **Z. We can define two waveforms and specify what information to use to move from one waveform to the other.** The height of your hand will define the amplitude of the modulation, the other modulation sources can be assigned to the morphing of the wave and/or the speed of the LFO. This module handles classic waveforms as well as custom waveforms that you can edit with the WaveEdit application .
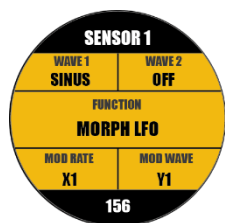
SENSOR button once or twice to select the sensor and then select this mode with the **E1 encoder** .

WAVE 1	E3	Selecting the main waveform
WAVE 2	E4	Selecting the secondary waveform
FUNCTION	E1, E2	Selecting the sensor Z management mode

MOD RATE	E5	Selecting the speed modification source
MOD WAV	SHIFT+E2	Selecting the morphing source from WAVE 1 to WAVE 2
SPEED	SHIFT+E5	Adjust the LFO speed. This setting can also be changed by repeatedly tapping the SHIFT button.

- ## SEQUENCE

A sequencer is available for each sensor. It is active for **SELECTED SEMITONE** , **RANGE NOTE** and **MICROTONAL** modes . The sequencer allows you to create a pattern transposed by the pitch of the note transmitted by the sensor. The sequences on microtonal scales are quite exciting.
Complex rhythms can be created by inserting silent steps.

SENSOR button once or twice to select the sensor-related sequence.
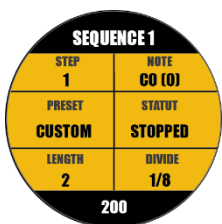
STEP	E3	Selecting the sequence step
NOTE	E4	Selecting the note played for the selected step. This note is expressed in + or – 24 semitones relative to the note rendered by the Z pitch of the sensor. OFF mutes the step allowing for the creation of complex rhythms.
PRESET	E1	Selecting a preset . These presets are defined in the SEQ/SEQUENCE.txt file on the micro SD. You can edit this file as you wish with a simple text editor.
STATUS	E2	Selects the sequence's state and playback mode: STOPPED = stopped, continuous = looping, ONE = once, STRUMMED = once very fast (harp or guitar style).
LENGTH	E5	Number of steps in the sequence (1.. 24)
DIVIDE	SHIFT+E2	Time division relative to the overall tempo
TEMPO	SHIFT+E5	Adjusts the overall tempo of The 3B. This setting can also be adjusted by repeatedly tapping the SHIFT button.

If a **pedal** is connected to the **Gate input**, you can choose in the **SYSTEM Page 2** settings to use the pedal to **launch the sequencer**.

- ## DISPLAY
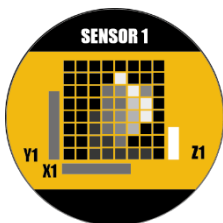
This function allows access to the visualization of sensor information.

The first press takes you to the spectacular display of the 8x8 matrix of the **sensor 1 , a kind of low-resolution camera, which allows you to extract X** and **Y** information from the position of the hand or another part of the body. In the future, other information (e.g. gestures) may be obtained.
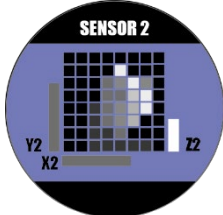
A second press displays the information from **sensor 2** .
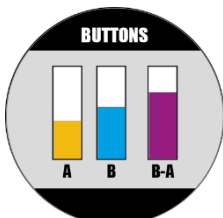
A third press displays information from the **two** pressure sensor buttons.

- # DIGITAL AUDIO ENGINE

The 3B integrates, for each sensor, a **digital audio generator** offering **classic waveforms** and **wavetables**, a **Karplus-Strong physical modeling** module, and an **ADSR** envelope. Each generator is **6-voices polyphonic**.

Karplus-Strong synthesis generates a **percussive signal** with **no sustain** and its own built-in envelope: only the decay/release time can be adjusted. Keep this in mind when modifying the VCA envelope parameters.

MODUL Src defines a modulation source: information from sensors, knobs, envelope or **CV In input** . For each source, the ' **-** ' version reverses the modulation direction.
If **MODUL Dst** is set to **WAVE MORPH , PULSE** (PWM) and **VARIABLE** (triangle to sawtooth) waveforms and **wavetables** will be modulated
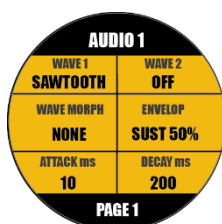If **MODUL Dst** is set to **LEVEL** , it is the amplitude of the audio generator that will be modulated.
If **MODUL Dst** is set to **FREQ** , it is the frequency of the audio generator that will be modulated.

AUDIO button once or twice to select the sensor's audio generator. The settings are on two pages. To change pages, press **SHIFT** and turn encoder **E5** .

The audio signal linked to the **yellow sensor** is available on the **OUT 1 jack**, that linked to the **blue sensor** on **OUT 2**.

To mute **both audio outputs**, press the **AUDIO button twice quickly**. The button will flash to indicate that mute is active. To unmute the outputs, press **AUDIO** again.

PAGE 1

WAVE 1	E3	Main waveform selection: **Sine** = sine, **Triangle** = triangle, **Sawtooth** = sawtooth, **Square** = square, **Pulse** = pulse, **Variable** = triangle/sawtooth blend, **KPLUS** = Karplus-Strong synthesis, **all subsequent waveforms** = wavetables.
WAVE 1 INDEX	SHIFT+E3	For Karplus-Strong synthesis, delay selection, acting as an adjustable damping pedal. For Wavetable synthesis, table index selection (1…64).
WAVE 2	E4	For Karplus-Strong synthesis, selection of noise or a wavetable as the exciter for the algorithm. For Wavetable synthesis, selection of the target wavetable for morphing.
WAVE 2 INDEX	SHIFT+E4	For wavetable or Karplus-Strong synthesis, selection of the table index (1…64) within the wavetable.
MODUL Src	E1	Selection of the modulation source and its direction
MODUL Dst	SHIFT+E1	Modulation destination selection: **LEVEL** amplitude modulation **FREQ** frequency modulation, except for Karplus-Strong synthesis, where it becomes delay morphing **WAVE MORPH** morphing between wavetables; timbre selection for Karplus-Strong synthesis; pulse width for Pulse, triangle <> sawtooth morphing for Variable.
ENVELOPE	E2	Enable or disable the envelope and adjust the sustain level
ATTACK ms	E5	Set the attack time of the envelope, expressed in milliseconds
Decay ms	SHIFT+E2	Set the envelope decay and release time, expressed in milliseconds. By convention, the release time is half the decay time .
PAGE	SHIFT+E5	Selecting the setting page (1..2)

PAGE 2

TRANSPOSE	E3	Selection of transposition expressed in semitones
GLIDE	E4	Adjust the glide between notes
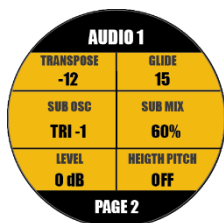
SUB OSC	E1	Sub-oscillator selection/activation (-1 = -1 octave, -2 = -2 octaves)
SUB MIX	E2	Setting the waveform/sub-oscillator mix
LEVEL	E5	Setting the audio gain/attenuation of this generator
HEIGHT PITCH	SHIFT+E2	This parameter activates and adjusts the amplitude of the ability to vibrato the note played with small hand movements.
PAGE	SHIFT+E5	Selecting the setting page (1..2)

- ## FILTER

A filter (Moog or OTA type, 12 or 24db/Octave, LP, BP, HP) completes each audio generator. The frequency and resonance of the filters can be modulated by information from sensors, knobs or the **CV In input** .

Press the **SHIFT buttons and the AUDIO** button once or twice simultaneously to select the sensor-related audio filter.
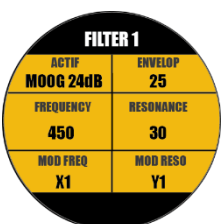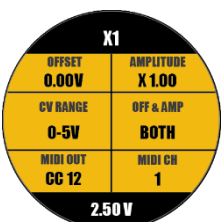
ACTIVE	E3	Filter selection: OFF, MOOG 24dB, OTA 12dB
ENVELOP TYPE	E4	MOOG 24 dB: Set the envelope rate on the OTA filter frequency 12 dB: Set the filter configuration (LP, BP, HP)
FREQUENCY	E1,	Set the filter frequency (expressed in Hz)
RESONANCE	E2	Adjust the filter resonance (0..100)
MOD FREQ	E5	Selecting the filter frequency modulation source
MOD RESO	SHIFT +E2	Selecting the filter resonance modulation source

- ## JACK CV (X1, Y1, Z1, A/X2, B/Y2, Z2)

These buttons allow you to access the settings for each of the **CV outputs** . The **offset** (expressed in volts) and the **amplitude** (expressed in coefficient) can affect only the internal routings (MORPHING LFO, MORPHING WAVETABLE) or simultaneously the internal routing and the voltage available on the jack. In the lower area, the voltage available on the jack is displayed in real time.

Press the button above the information/JACK to be configured

OFFSET	E3	Set the voltage offset (-5V to +5). This setting is also active on internal modulations (morph etc.)
AMPLITUDE	E4	Increase or decrease the voltage amplitude (x 0.0 to x2.0). This setting is also active on internal modulations (morph etc.)
CV RANGE	E1	Set the maximum voltage range available on the jack.
OFF & AMP	E2	Choose whether OFFSET and AMPLITUDE apply only to internal routings (INTERN) or also to the physical output (BOTH).
MIDI OUT	E5	Selection of the MIDI message generated by the information
MIDI CH/ SOURCE	SHIFT+E5	MIDI channel selection or source inforrmation. This setting is only accessible on Z1, Z2, A/X2 and B/Y2. For A/X2 and B/Y2 , this setting switch the source : sensor or pression button. For X1 and Y1, the MIDI channel used will be that of Z1. For X2 and Y2, the midi channel used will be that of Z2.

If the sensor is in **OFF / MIDI IN** mode, the **MIDI OUT** parameter becomes **MIDI IN**.

MIDI IN	E5	Selection of MIDI information to be converted into voltage
		NONE No conversion
		VELO.. Velocity
		AFTER. Aftertouch
		WHEEL Modulation (MIDI CC 1)
		BEND Pitch/bend wheel
		VOLUME MIDI CC 7

- ## JACK GATE (G1, G2)

These buttons provide access to the settings for each of the **GATE outputs** . The choice of **S-TRIG** (open collector) or **standard GATE mode** is made on the back of the module by a jumper. In the lower area, the voltage available on the jack is displayed in real time.

Press the button above the information/ **GATE jack** to be configured.

For the generation of ON and OFF notes, the MIDI channel used is the one defined in Z1 and Z2.
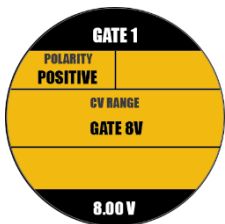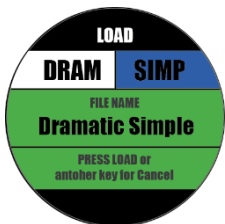
POLARITY	E3	Polarity Selection :
		POSITIVE = 0FF -> 0V, ON->CV Range
		NEGATIVE = 0FF -> CV Range, ON->0V
CV RANGE	E1	GATE amplitude selection (5V, 8V)

- ## LOAD

This function allows you to **recall a previously saved complete configuration**.

Press the **LOAD button**

SELECTION	E1	Selecting a file on the micro SD

LOAD again to load this configuration **.**

- ## SAVE

This fonction **save the complete configuration** in a file on the microSD that you can easily extract to backup or manage/rename your configurations.

As the screen does not allow satisfactory entry of a name, a system using **keywords** and **index/adjective** has been defined.

An option allows to generate the MULTI SEQ file which will be available in SD SEQUENCE of the MULTI SEQ mode and/or the SCALA file which will be available in PRESET of the MICROTONAL mode.

Press the **SHIFT** and **LOAD buttons simultaneously**
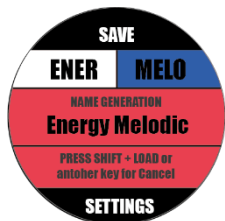
KEYWORD	E3	Keyword selection
INDEX/ADJECTIVE	E4	Selection of the index or adjective associated with the keyword
NAME GENERATION		Displaying the generated full name
ACTION	SHIFT+E5	Selecting what will be saved: **SETTINGS** the complete configuration **M.SEQ** a MULTI SEQ **SCALA file** a SCALA **ALL file** All

Press again the **SHIFT** and **LOAD buttons simultaneously** to execute the configuration save.
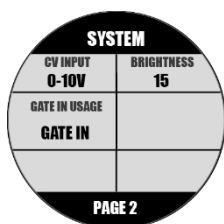
• SYSTEM

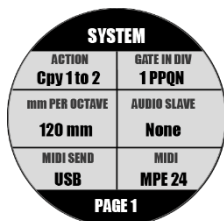**The 3B** 's general sound **settings** and **options** .

Press the **SHIFT** and **SEQ buttons simultaneously**

PAGE 1

ACTION	E4	Selecting an action to perform: **Copy 1 to 2** Copies all settings from sensor 1 to sensor 2 **Copy 2 to 1** Copies all settings from sensor 2 to sensor 1 **Reset 1** Initializes all settings for sensor 1 **Reset 2** Initializes all settings for sensor 2 **Reset All** Initializes all settings for both sensors
CV INPUT	E3	Selecting the amplitude of the incoming signal on CV In
GATE IN DIV	E4	Résolution du signal **horloge** envoyé sur le jack **Gate In** : choisissez la même résolution que celle définie sur l'équipement générateur du signal.
mm PER OCTAVE	E1	Selects the pitch of an octave (72, 96, 120, 180, and 240mm)
AUDIO SLAVE	E2	The AUDIO slave mode allows you to link the audio generator of one sensor to the other sensor, thus allowing for bitimbrality and the release of a sensor to assign it a mode like **THEREMIN EXPR.** ENV or **LFO** . **None** No link **2 from 1** Audio from sensor 2 is slaved to sensor 1 **1 from 2** Audio from sensor 1 is slaved to sensor 2
MIDI SEND	E5	MIDI Message Destination **No** No MIDI output **USB** MIDI messages are generated on the USB port **MIDI** MIDI messages are generated on the DIN socket **BOTH** MIDI messages are generated on both
MIDI	SHIFT+E2	MIDI protocol used **STD 2** midi with BEND over 2 semitones. **STD 12** midi with BEND over 12 semitones. **STD 24** midi with BEND on 24 semitones. **MPE 12** MPE 8 channels with BEND on 12 semitones **MPE 24** MPE 8 channels with BEND on 24 semitones **NRPN** BALORAN proprietary mode
PAGE	SHIFT+E5	System page selection (1..2..3)

PAGE 2

CV INPUT	E3	Selecting the amplitude of the incoming signal on CV In
BRIGHTNESS	E4	**Brightness** of buttons and display (1..15)
GATE IN USAGE	E1	Selection of **GATE IN** jack function: **GATE IN** This jack receives a classic Gate/Clock signal. **PAUSE 1S** A pedal connected to this jack activates the sensor pause mode: pedal pressed = pause, pedal released = pause deactivated. **PAUSE 2S** A pedal connected to this jack activates the sensor pause mode: pedal pressed = pause, pedal pressed a second time = pause deactivated. **PLAYSEQ 1S** A pedal connected to this jack activates the sequencer: pedal pressed = run, pedal released = stop. **PLAYSEQ 2S** A pedal connected to this jack activates the

		sequencer: pedal pressed = run, pedal pressed a second time = stop.
	AUDIO 1S	A pedal connected to this jack activates the AUDIO mute: pedal pressed = mute, pedal released = unmute.
	AUDIO 2S	A pedal connected to this jack activates the AUDIO mute: pedal pressed = mute, pedal pressed a second time = unmute.
PAGE	SHIFT+E5	System page selection (1..2..3)

PAGE 3

By default, **The 3B** comes with sensor settings suitable for most environments. However, adjusting these settings may improve performance depending on the geometry and lighting conditions of the space.
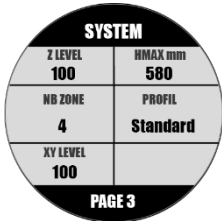
Z LEVEL	E3	**Minimum signal level**: threshold below which height information is ignored.
HMAX mm	E4	**Maximum detection height (in mm):** above this value, the hand is considered out of range.
NB ZONE	E1	**Minimum number of active zones** (matrix points) required to validate height information.
PROFIL	E2	Preset selection: **Standard** versatile configuration (default setting) **HI Level** increases vertical sensitivity **Low Level** adapted for rooms with low ceilings **Full Sun** optimized for outdoor use in direct sunlight
XY LEVEL	E5	**Minimum signal level** used for X and Y position calculation.
PAGE	SHIFT+E5	System page selection (1..2..3)

Press again the **SHIFT** and **SEQ buttons simultaneously** to save settings and/or perform the selected action.

You can enjoy **MICROTONAL** or **THEREMIN** modes even on a non-MPE midi synthesizer provided you can set the BEND range to at least + or - 12 semitones , + or - 24 being ideal and by selecting the correct MIDI mode in this screen.

- ## CALIBRATION

This function allows you to tune external **VCOs connected to Z1** and **Z2** by optimizing the **CV curve** for greater accuracy. It also allows global tuning of each of the integrated audio generators . It also allows calibration of buttons **A** or **B**. Finally, this function allows you to calibrate the **CV In** if you connect the **B/Y2 jack to the CV In** jack during operations.

The principle is simple, the audio generators are activated simultaneously with the voltages emitted on **Z1** and **Z2** . All follow the octave selected with **E1** . Use **ADJUST Z1** to get the best match between audio generator 1 and the VCO connected to **Z1** over all 5 octaves. It is best to mute audio 2 and the VCO connected to **Z2** during this adjustment.

Use **ADJUST Z2** to have the best match between audio generator 2 and the VCO connected to **Z2** , always for the 5 octaves. It is best to mute audio 1 and the VCO connected to **Z1** during this adjustment.

If you set octave 1 and then octave 5 directly, then octaves 2, 3 and 4 will be automatically filled in. For more precise adjustment, do 1 first, then 5 then touch up 4, 3 and 2.

Press the **SHIFT** and **DISPLAY buttons simultaneously**

ADJUST Z1	E3	Adjust Z1 voltage for the selected octave
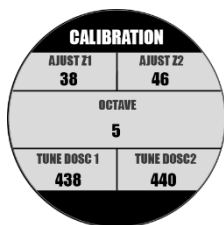
ADJUST Z2	E4	Adjust Z2 voltage for the selected octave.	
OCTAVE	E1	Selecting the octave that will be optimized	
TUNE DOSC1	E5	Adjust the overall tuning of audio generator 1	
TUNE DOSC2	SHIFT+E2	Adjust the overall tuning of audio generator 2	

If you press either button **A** or **B** during calibration, then press the button with **the amount of pressure** you consider to be **the maximum** for your use. This maximum will be **stored individually** for each button.

Press again the **SHIFT** and **DISPLAY buttons simultaneously** to save the calibration.

- ## PAUSE

This function **freezes the sensors**, which allows you to freeze a moment in LIVE mode to free your hands and make other adjustments.

It does not show a specific screen, its activation is visible by the two-color flashing of the **SENSOR button** .

Press the **SHIFT** and **SENSOR** buttons simultaneously or press **SENSOR** twice quickly to activate this function. Press **SENSOR again** to deactivate the pause.

If a **pedal** is connected to the **Gate input**, you can choose in **SYSTEM Page 2** settings to use the pedal to activate the pause.

- ## Memory Card

The microSD memory card contains all operating parameters as well as your saved configurations.

Removing the card

Turn off the power to **The 3B**. In the BOX version, the card is located in its reader on the left side of the enclosure: push the card in until you hear a **click** to unlock it, then remove it from the slot. In the Eurorack version, remove The 3B from the rack and simply pull out the card.

Inserting the card

Ensure **The 3B is powered off**. In the BOX version, insert the card until it **clicks** into place. In the Eurorack version, slide the card into the slot until it is fully seated. You can then **power up The 3B**.

Card Folders

@3B   This folder stores all presets saved using the SAVE function. Each file name is composed of the first four characters of the keyword, an underscore, the first four characters of the index/adjective, and the .3B extension.For live or scene purposes, you may rename the files as needed. In this case, the new name will appear in the LOAD screen but cannot be saved again under that custom name.

CHORD   This folder contains preset definitions used in the **MULTI SEQ** mode. These are simple text files with the .chord extension. The name appears in the **SD SEQUENCE**

section of the **MULTI SEQ** screen. The 3-character prefix before the name sorts the presets in the list. Example definition:

Text Line	Explanation
NOTES, 4, C4	Reference: 4 zones by octave, root note C4. NOTES : All notes are exprimed as pitch names, MIDI : all notes use MIDI notation.
Cm,3,C3,G3,Eb4,	1st interval, label, 3-note list
Fm,4,F2,C4,NONE,G#4,	2nd interval, label, 4-note list with a rest
Gm,4,G2,A#3,D4,G4,	3rd interval, label, 4-note list
Bd7,4,B2,F4,G#4,G#4	4th interval, label, 4-note list

LFO This folder contains a wavetable file named **00LFO.WAV** with the 16 waveforms (WAVE1..16) used in MORPH LFO mode. You can edit this wavetable using the WaveEdit software by *Synthesis Technology.*

NAMES This folder holds two text files: PREFILE.TXT for **keyword** definitions and POSTFILE.TXT for **adjectives/indexes** used in the SAVE and LOAD functions. *It's important to use words whose first four characters are unique to ensure proper identification.*

SCALA This folder contains standard SCALA files. SCALA is a software tool for working with microtonal tuning systems and alternative scales beyond the traditional 12-tone equal temperament.

SEQ This folder includes a text file (SEQUENCE.txt) that defines the **presets** accessible from the **SEQUENCE** screen. Each line describes a **preset**. Example:
EchoStep,8,57,0,OFF,+7,OFF,0,OFF,+7,OFF
This defines a preset called *EchoStep* with 8 steps, root MIDI note 57, and a step sequence expressed in semitone offsets (±24), with OFF representing a rest.

WT This folder holds all the **Wavetables** used in The 3B's synthesis engine.
They follow the format: 64 x 256 samples, 16-bit mono, and are compatible with *Synthesis Technology* WaveEdit software.
Each filename must begin with a three-digit **ID** followed by an underscore (123_Wavename.wav). This **ID is critical**, as it is stored in your configuration files. If you rename a wavetable but keep the same ID, all presets referencing it will still find it correctly.

• The 3B Update

For any questions regarding usage, updates, bug reports, suggestions or feedback, please use the forum whenever possible. This helps centralize and share information. If your forum registration isn't validated quickly, send me an email at **laurent@baloran.com** *with the address you used to register.*

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Installing the software and update file

On the forum, in the **The 3B** > **Firmware updates, manuals** section, open the thread for the latest version, read any relevant information, and unzip the downloaded file to a folder of your choic.
If you haven't installed the update tools yet:
On **Windows**: download https://www.baloran.com/The3B/Firmwares/tytools_0.9.9_win64.zip
On **Mac**: download https://www.baloran.com/The3B/Firmwares/tytools_0.9.9_macos.dmg
Unzip and/or install these files in the same folder where you placed the update file.

Updating The 3B

If you have the **BOX version**, connect a **USB type A to B 2.0** cable (under 2 meters) between your computer and The 3B. **Then power on The 3B**.

If you have **The 3B Eurorack version**, unscrew the module (without disconnecting anything), just enough to connect a **USB type A to micro USB 2.0** cable (under 2 meters) between your computer and The 3B's processor. **Then power on your Eurorack**.

Launch the **TyUploader** application. You should see the following screen:
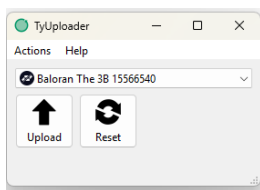
In the dropdown list, a line should appear similar to
: **Baloran The 3B xxxxxxxxx**

Click the **Upload** icon. A file selection window will appear. Choose the file **The3B_xxx.hex** and click **Open**. A progress bar will indicate the update status.

The 3B will **automatically reboot**, confirming that the update was successful. The screen will briefly show the installed version—make sure it matches the expected one.

That's it 😊