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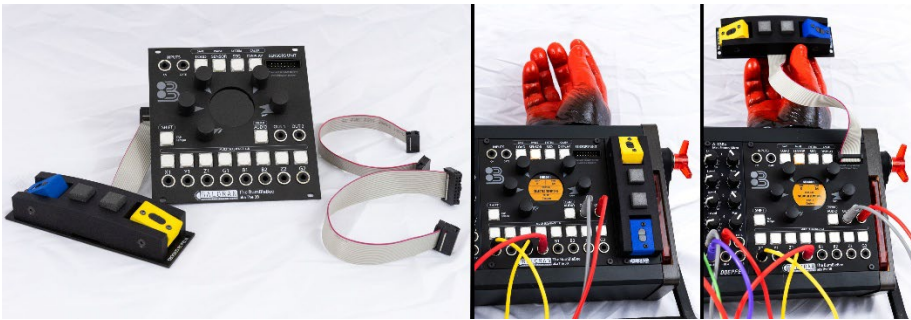
“ Your hands create the sound . Every gesture becomes emotion , every movement , a new sonic landscape » ,

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

Laurent, Baloran SAS

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.

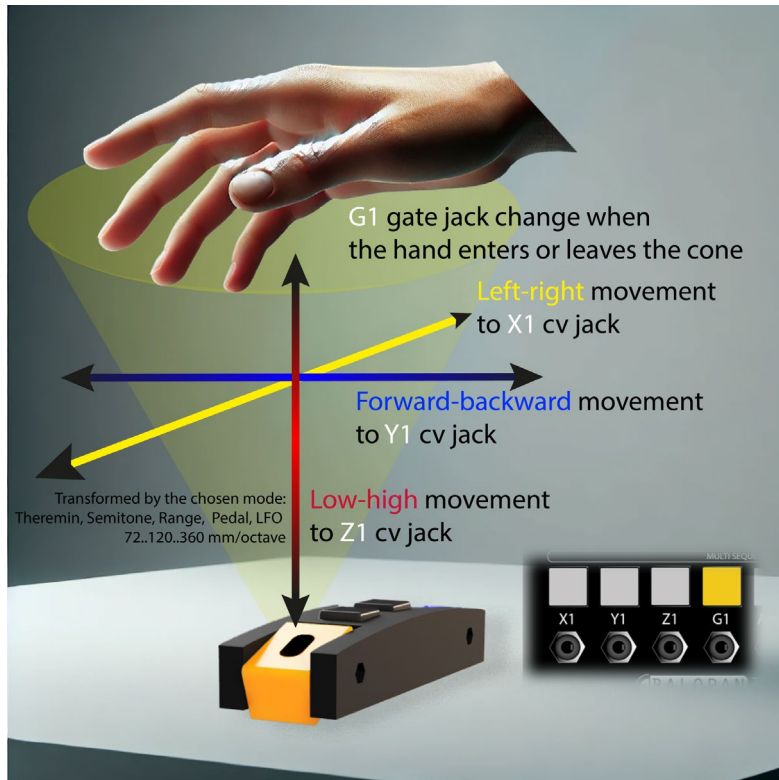


An optional self-powered external box is available to make the unit completely autonomous. It adds MIDI DIN out, USB MIDI In/Out, and a microSD card port .



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**.

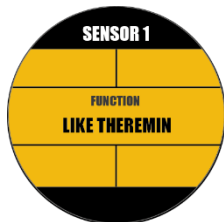


A second identical sensor, placed on the right (**blue** adjustable support), transmits the coordinates **X2**, **Y2**, **Z2** as well as a GATE **G2**, allowing completely independent two-handed play.

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, knob A decrements the value, B increments it and both can act simultaneously to allow excellent fineness of control.

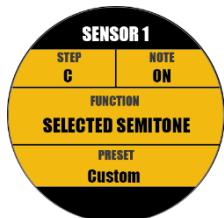
III. Height information management (Z1 and Z2).

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.



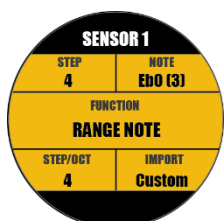
LIKE THEREMIN mode

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)



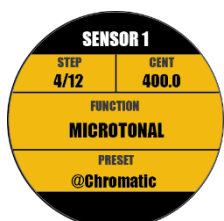
SELECTED SEMITONE mode

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.



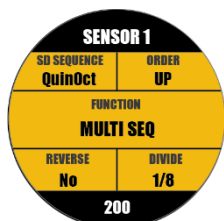
RANGE NOTE mode

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.



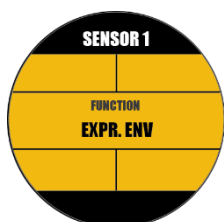
MICROTONAL mode

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.



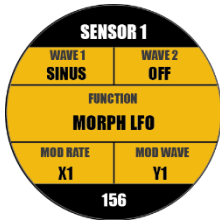
MULTI SEQ mode

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.



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.

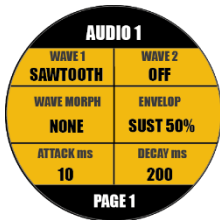


MORPH LFO mode

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 .

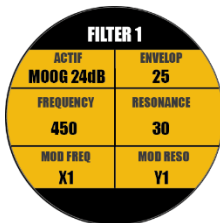
IV. Built-in audio generators.

For each sensor, **The 3B** integrates a **high-quality 16bit 96K digital audio** generator. Oscillators include **classic fixed** and **variable waves**, as well as **wavetables**. A **multimode filter** (Moog 24dB or OTA 12dB/octave, LP, BP, HP) and an **ADSR envelope** complete each generator.



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.

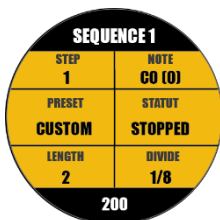
The **wavetables** are saved on the **microSD** and editable with the **WaveEdit** application .



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.

V. 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.

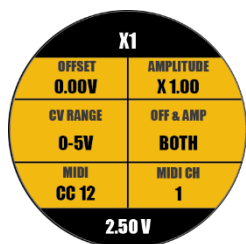
This screen allows you to directly modify the steps of the sequence, the time division relative to the global tempo and the playback mode. Complex **rhythms** can be created by inserting **silent** steps.

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

VI. 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 .



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.

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.

VII. 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.

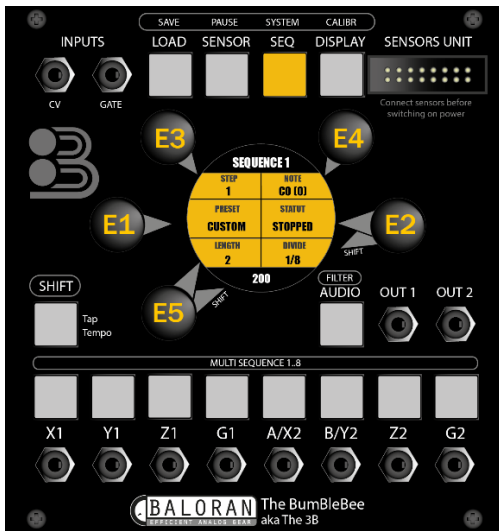
Every synthesizer can also access **microtonal** scales , with some restrictions on polyphony if you're not in MPE.

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.

VIII. 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**

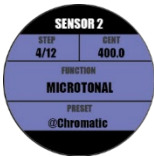


*Note the names of the encoders **E1** to **E5**. They will be used throughout this document. Another important rule is that settings that affect **sensor 1** are always displayed on a **yellow** background. For **sensor 2**, the background is **blue**. The illuminated buttons follow this rule: they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

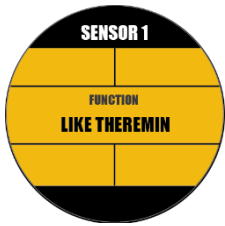
Third press, you return to sensor 1 and so on...

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.

IX. References

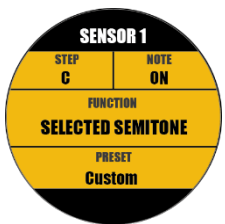
- LIKE THEREMIN mode



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](#)

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

- SELECTED SEMITONE mode

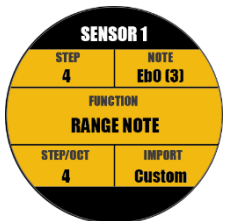


By default, with a setting of **120mm** per octave, if you move your hand **10mm**, the next or previous **semitone** will be played. The **GATE** in this mode is turned on/off for each note played. You can **enable/disable** semitones of your choice, for example to allow only the “white” notes to be 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

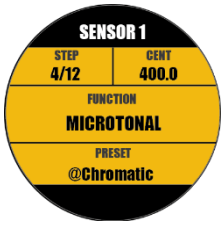


In this mode, set the **number of intervals** per octave and **assign** each interval **a note** relative to the Z pitch returned by the sensor. Example: divide the 120mm into four 30mm zones, and assign the notes **C-1, C, G-1, G+1**. In the first 120mm, this mode will therefore play **C1, C2, G1, G3**,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

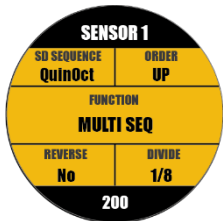
SENSOR button once or twice to select the sensor and then select this mode with the **E1 encoder** . **STEP** is automatically selected by the **Z** of the sensor.

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

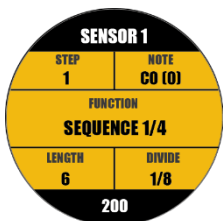
- MULTI SEQ mode

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** .

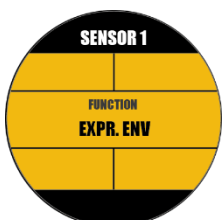


SD SEQUENCE	E3	Select one MULTI SEQ from the micro SD.
ORDER	E4	Set the playback mode of sequence steps.
FUNCTION	E1, E2	Selecting the sensor Z management mode
REVERSE	E5	Cause inversions for the higher octaves
DIVIDE	SHIFT+E2	Time division relative to the overall tempo



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



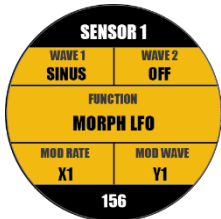
In this mode, the sensor acts like an **expression pedal**. Above 200mm nothing happens. Below, bringing your hand closer to the sensor acts as if you were pressing the volume pedal, the voltage emitted on **Z** increases.

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 .

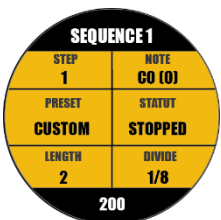


SENSOR button once or twice to select the sensor and then select this mode with the **E1** encoder .

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.

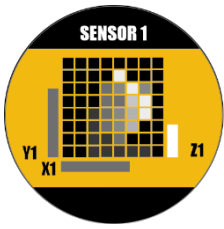


Complex rhythms can be created by inserting silent steps.

SENSOR button once or twice to select the sensor-related sequence.

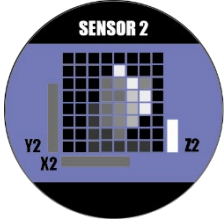
STEP	E3	Selecting the sequence step
NOTE	E4	Selecting the note played for the selected step. This note is expressed in + or – 24 semitones relative to the note rendered by the Z pitch of the sensor. OFF mutes the step allowing for the creation of complex rhythms.
PRESET	E1	Selecting a preset . These 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.

- **DISPLAY**

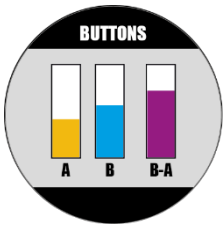


This function allows access to the visualization of sensor information.

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.

- **AUDIO**

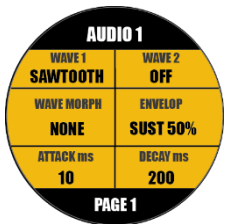
The **3B** integrates for each sensor a **digital audio generator offering classic and wavetable waveforms** , an **ADSR envelope** . The **Z** pitch transmitted by the sensor changes the pitch of the sound.

MODUL Src defines a modulation source: information from sensors, knobs, envelope or **CV In input** . For each source, the ' - ' version reverses the modulation direction.

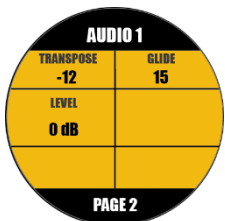
If **MODUL Dst** is set to **WAVE MORPH** , **PULSE** (PWM) and **VARIABLE** (triangle to sawtooth) waveforms and **wavetables** will be modulated

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** .



PAGE 1

WAVE 1	E3	Main waveform selection
WAVE 1 INDEX	SHIFT+E3	For a wavetable , select the table index (1...64)
WAVE 2	E4	Secondary Waveform Selection
WAVE 2 INDEX	SHIFT+E4	For a wavetable , select the table index (1...64)
MODUL Src	E1	Selection of the modulation source and its direction
MODUL Dst	SHIFT+E1	Modulation destination selection: LEVEL, FREQ, WAVE MORPH
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 .

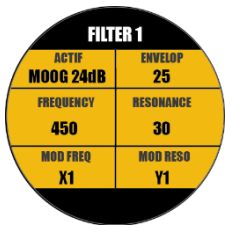
PAGE	SHIFT+E5	Selecting the setting page (1..2)
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PAGE 2

TRANSCOPE	E3	Selection of transposition expressed in semitones
GLIDE	E4	Adjust the glide between notes
LEVEL	E1	Selecting the sensor Z management mode
PAGE	SHIFT+E5	Selecting the setting page (1..2)

• AUDIO 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** .

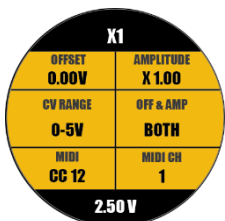


Press the **SHIFT buttons and the AUDIO** button once or twice simultaneously to select the sensor-related audio filter.

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.

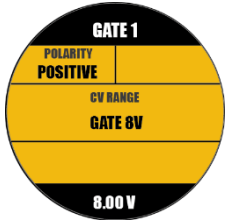


Press the button above the information/JACK to be configured

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).
NOON	E5	Selection of the MIDI message generated by the information
MIDI CH	SHIFT+E5	MIDI channel selection. This setting is only accessible on Z1 and Z2. 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.

- 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.



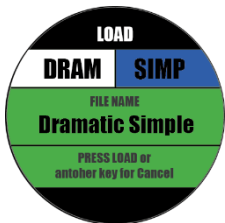
Press the button above the information/ **GATE jack** to be configured.

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 = OFF -> 0V, ON->CV Range NEGATIVE = OFF -> 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**

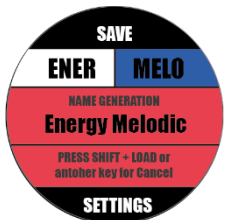
SELECTION	E1	Selecting a file on the micro SD
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LOAD again to load this configuration .

- 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**

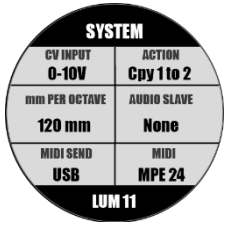
KEYWORD	E3	Keyword selection
INDEX/ADJECTIVE	E4	Selection of the index or adjective associated with the keyword
NAME GENERATION		Displaying the generated full name
ACTION	SHIFT+E5	Selecting what will be saved: SETTINGS the complete configuration M.SEQ a MULTI SEQ SCALA file a SCALA ALL file All

Press 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**



CV INPUT	E3	Selecting the amplitude of the incoming signal on CV In
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
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 link 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
NOON	SHIFT+E2	MIDI protocol used None No noon message 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

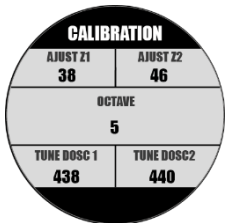
Press the **SHIFT** and **SEQ** buttons **simultaneously** to save settings and/or perform the selected action.

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 . Finally, this function allows you to calibrate the **CV In** if you connect the **B2 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

Press 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** to activate and deactivate this function.