
SOMA
TERRA
USER
MANUAL
SOMA
TERRA

CONTENTS

GENERAL OVERVIEW . . . 3
WHAT IS TERRA? . . . 3
THE CONCEPT . . . 3
MAIN FEATURES . . . 4
IMPORTANT NOTES ABOUT TERRA'S SENSORS . . . 6
CONNECTING TERRA . . . 7
THE INTERFACE . . . 8
THE TRIANGULAR INDICATOR-CONTROLLER . . . 10
PLAYING TERRA . . . 11
DESCRIPTION OF FUNCTIONS . . . 13
LOADING A PRESET . . . 13
SAVING A PRESET . . . 13
SELECTING A SYNTHESIS ALGORITHM . . . 14
SELECTING A VARIATION FOR A SYNTHESIS ALGORITHM . . . 15
SETTING THE GYROSCOPE'S SENSITIVITY . . . 15
CONTROLLING THE ENVELOPES . . . 15
≈ AND ☼ KNOBS . . . 16
THE FX PROCESSOR . . . 16
TUNING THE NOTE KEYBOARD . . . 16
USING +‿-+‿- WHILE PLAYING . . . 18
SELECTING A +‿-+‿- PRESET . . . 18
TUNING A +‿-+‿- PRESET . . . 19
SYNCHRONIZING THE LFO AND ARPEGGIATOR TEMPO . . . 20
MIDI OUTPUT . . . 20
MASTER-TUNE . . . 23
UPDATING THE FIRMWARE . . . 23
SAVING PRESETS TO A USB DRIVE . . . 24
CALIBRATION . . . 25
DESCRIPTION OF THE SYNTHESIS ALGORITHMS . . . 26
THE BASICS . . . 26
POLYPHONIC ALGORITHMS GROUP . . . 27
EXPERIMENTAL ALGORITHMS GROUP . . . 35
BASS ALGORITHMS GROUP . . . 43
SOLO ALGORITHMS GROUP . . . 51
TABLES . . . 59
FACTORY PRESETS FOR +‿-+‿- . . . 59
ARPEGGIATOR PATTERNS . . . 60
MIDI CONTROLLER ASSIGNMENT OF TERRA'S SENSORS . . . 60
TECHNICAL CHARACTERISTICS . . . 61
WHAT'S INCLUDED . . . 61
CREDITS . . . 62

GENERAL OVERVIEW

WHAT IS TERRA?

TERRA is a multifaceted polyphonic, microtonal, digital synthesizer with vast unusual capabilities and approaches. It features a unique and ultra-minimalist interface and design using natural materials and forms. TERRA explores new principles for building musical instruments and innovative ways for interacting with them.

THE CONCEPT

TERRA was born in search of a balance, a golden mean between polar opposites such as broad possibilities vs. simplicity, and technology vs. nature.

The primary aim of developing TERRA was to enable musicians to create complex, fluid musical parts, timbres and textures, using an immediate intuitive performance instead of a long exhausting programming and editing session. TERRA allows you to largely sculpt a timbre on-the-spot, using control of timbre as an expressive device.

TERRA is our exploration, our vision of a perfect relationship between human being and machine. When you interact with TERRA, it makes you free to focus on your emotions, to remain completely present in the moment, and thereby staying in touch with yourself, connected to your spirit and your roots.

The solid-wooden enclosure with smooth natural contours, as well as the special semi-spheric metal controls, feel very pleasant to the touch, resonating with our instinctive sense of harmony.

Playing TERRA is an immersive journey, a meditation, an intimate interaction. All the functions and capabilities are within a few finger touches. There is no menu diving or scrolling through different pages. The extremely simple and ergonomic interface keeps you relaxed and fresh, letting you focus all your energy and inspiration on creating.

It's a complete, stand-alone performance instrument for live and studio use. TERRA is a reliable foundation for your performance, and a friend to help you explore the infinity of art and share your soul's treasures through music.

MAIN FEATURES

- A unique microtonal keyboard consisting of twelve dynamic semi-spheric metal sensors, and a Pitch Shifter transposing the notes played into sixteen intervals. This gives you a range of 120 semitones with a step of 0.8 cents, with an ability to instantly transition around the entire range. Unique keyboard ergonomics allow for very different touches and techniques than those used on a piano. This in turn inspires new approaches to composing and performing.

- Each of the twelve sensors and sixteen Pitch Shifter positions can be individually tuned in semitone steps or microtonally. The whole keyboard can be transposed in octave or semitone steps. That enables you to create your own microtonal scales or microtonal pitch shifting systems. Those can be saved to memory. Up to 96 scales and 24 pitch shifting sets can be saved.

- TERRA has a master-tuning control with a range of +/- 1 semitone.

- TERRA's sensors are velocity- and pressure-sensitive, which gives you direct control of envelope and timbre, as well as glissandi. You can play sharp and short plucks, or long attacks and sustains, or use portamenti—all without changing the instrument settings. With TERRA, many of the parameters which are usually automatically controlled, are now directly in the musician's hands. All of which allows for unique expressive options not found in conventional synths.

- In addition to the twelve pitch control sensors, TERRA has four dynamic sensors for controlling timbres, modulations and various synthesis parameters. The sensors' ergonomics allow you to control all four parameters simultaneously—unlike the usual knob-wheel-slider interfaces where you need a whole hand to tweak one controller.

- Instead of a traditional display, TERRA has a minimalist Triangular Indicator-Controller using six sensor-indicators.

- TERRA features a custom all-digital architecture synthesis, which builds on a complex hybrid of FM, additive, subtractive synthesis with elements of physical modeling and a range of special innovations. The synthesis and processing are high-resolution 32-bit floating-point quality. The digital signal processing contains tube-amp emulations taken from actual vintage devices.

- TERRA contains 32 unique synthesis algorithms, each of which forms a complete performance-ready instrument. The timbre and synthesis control involves the four sensors, four knobs and the Triangular Indicator-Controller that derives up to 64 variations for each synthesis algorithm. The functions of each sensor, knob and Triangular Indicator-Controller element for each algorithm are pre-set and cannot be changed.

- 1 to 12 voice polyphony, depending on the algorithm.

- A built-in Gyroscope, turning the slightest physical motion of the instrument into synthesis parameters modulation.

- TERRA has an effect processor with Echo and Reverb modes, controlled by two knobs and one sensor switch.

- All key and synthesis settings can be stored to presets. There are 6 preset banks with 16 presets in each — a total of 96 presets. Loading a preset is very fast, pressing a special sensor and one of the keyboard's sensors. That allows changing presets on-the-fly, usable as an artistic device.

- Presets and other adjustments can be saved to and loaded from a USB Flash drive.

- Some of the algorithms have a rhythmic LFO and an arpeggiator, their tempo controllable by rotating a knob, tapping on a sensor, or external MIDI/CV-clock synchronization. You can use the Triangular Indicator-Controller to change the amount multiplying the tempo: 1, 3/2, 2. That allows using a fast change of LFO or arpeggiator tempo as a musical device. The LFO has 8 waveforms, and the arpeggiator 13 motion patterns. As a unique feature, the arpeggiatoris controlled by the LFO, forming the sound's envelope. All 8 of the LFO waveforms are available for this, for a total of 104 arpeggiator patterns.

- TERRA has a MIDI output, allowing the use of its interface as MIDI controller for other synths and MIDI devices.
  There are three MIDI modes available:
  1. All 16 sensors send CC messages and are used as CC MIDI controllers. The Gyroscope sends pitchbender messages.
  2. The 4 timbre-control sensors send CC messages and are used as CC MIDI controllers. The 12 note-control sensors send note on/off messages including velocity. The pitch of the notes sent is controlled by the keyboard and Pitch Shifter settings and conveys the original performance on TERRA without the microtonal component. The Gyroscope sends pitchbender messages.
  3. MPE mode. Same as Mode 2, but with the microtonal component included, and continually sending each note sensor's state as CC messages.

- TERRA can be synched to an external MIDI clock, but there is no way to control TERRA via external MIDI due to how radically different and more complex TERRA's synthesis control is. It's a constant and multilayered high-resolution data stream, conveying the smallest motion of a finger. Confining that unique synthesis to a cage of on/off MIDI messages would kill 70% of TERRA's charm, and even MPE wouldn't help. So we dropped that idea.

- The sound is converted to analog by a high-quality Burr-Brown D/A converter. Its analog part is built on discrete components using a unique circuit with NOS germanium transistors. The output stage works in class A.

- All of this gives TERRA its uniquely warm and detailed sound, perfect for both on stage and in the mix.

- The controls are metallic sensors with a virtually infinite service life.

- TERRA's body is made of high-grade solid woods, brass and steel. The construction is as convenient in your lap as it is on a table.

- TERRA's software can be updated via USB Flash Drive.

IMPORTANT NOTES ABOUT TERRA'S SENSORS

TERRA's dynamic sensors (sixteen large brass sensors) are covered in a special thin lacquer necessary to correctly register capacitance. It's a durable lacquer, but can still be damaged with improper use. Please use TERRA only as instructed below.

Please don't touch or play the sensors with any hard items or materials — use only the soft parts of your hands and fingers! Otherwise you can damage the lacquer and cause the sensor to work incorrectly. Rings, chains, bracelets can all do damage, so please be careful when wearing jewelry.

Please don't connect any devices, contacts or wires to TERRA's sensors! Firstly, it's useless, because the sensors are not controllable by external devices — they work on different principles. Secondly, it can damage the sensor.

The sensor is to be controlled only by fingers (or other soft, living body parts) and nothing else!

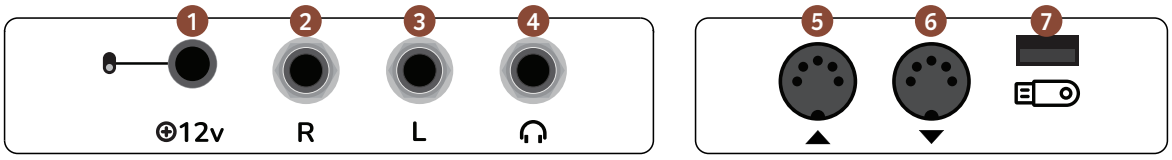
However, if a sensor gets damaged — e.g. the lacquer on a dynamic sensor got scratched off — it's easily replaceable by the user. Just take off the back cover of TERRA and unscrew the easily-accessible screw holding the sensor. You can buy replacement sensors from us: somasynths@gmail.com

A small scratch or damage on the lacquer is user-fixable by applying quality colorless nail-polish. Lacquer is considered damaged when metal is exposed.

TERRA's sensors are very sensitive. Therefore, for their correct operation (without interference), the TERRA circuit must be grounded! This usually happens automatically when connected to a mixer or amplifier. However, in some cases it may be necessary to do this manually. In particularly difficult conditions, such as at concerts with ungrounded or partially defective equipment, you can solve the problem by connecting your body to the ground of TERRA. This can be done by putting a metal bracelet on your hand, connected by a thin wire to the metal case of any 1/4 inch jack plug inserted into the TERRA outs. And of course please remember that using ungrounded equipment is dangerous and must be avoided!

You can use a soft cloth such as a microfiber dust cloth for cleaning the sensors. Do not use cleaning agents or any liquids, at most it can be mildly damp but not wet.

CONNECTING TERRA



1 12 volt DC input, 0.4A, "+" in the center, 5.5 x 2.1 mm; and the power switch connected to it. TERRA comes with a high-quality power supply. In case of losing it, use a high-quality modern switching power supply with corresponding parameters!

2 RIGHT CHANNEL line output TS/TRS 1/4 inch jack.

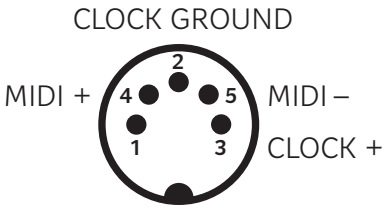
3 LEFT CHANNEL line output TS/TRS 1/4 inch jack.

Connecting only one jack to any of the two outputs activates a mono-output mode: the output's stereo signal folds down into mono. The headphones output then also goes mono.

TERRA's outputs work with balanced connections.

4 Headphones output TRS 1/4 inch jack.

5 MIDI input, combined with a CV-clock input. To connect an external CV clock, use the DIN5 (male) — 3.5 mini-jack (female) adapter included in the package. The CV-clock input can receive positive impulses of 3 to 15 volts and is used for synchronization with external devices such as step sequencers, Eurorack systems, or analog drum machines.



MIDI/CV-clock input wiring diagram
(MIDI socket viewed from the outside)

The input's wiring allows you to directly connect the legendary Roland TR-series drum machines equipped with a DIN SYNC connection.

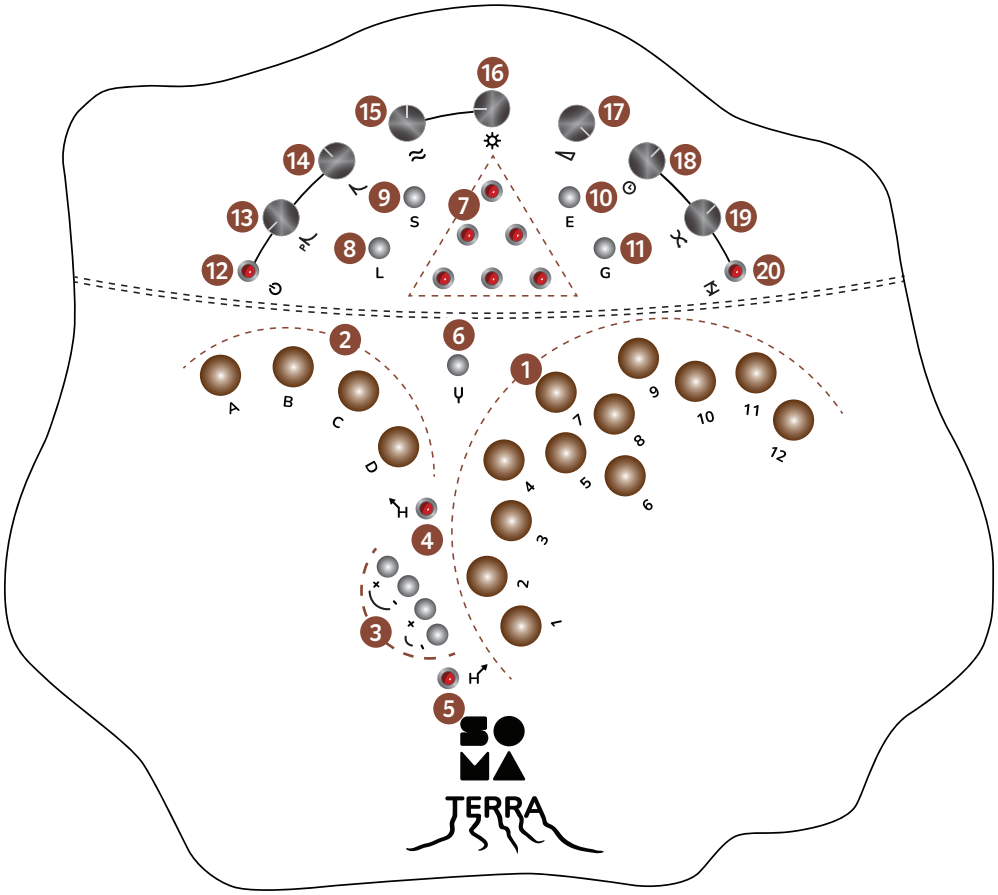
The input is designed so that the CLOCK GROUND on the 2nd pin doesn't conflict with MIDI Standard, because the signal is lifted from TERRA's ground by a special capacitor.

6 MIDI OUTPUT.

7 A USB PORT for connecting USB Flash Drive.No other devices allowed! There is no MIDI over USB possible!

THE INTERFACE

TERRA's interface can be divided into two zones — PLAY (lower part) and CONTROL (upper part).



The PLAY zone includes:

1 **The note keyboard**, consisting of dynamic sensors **1**-**12** (hereafter **1**-**12**). You can use them to play notes, store and load presets, and to adjust the Pitch Shifter.

2 **The parametric keyboard**, consisting of dynamic sectors **A**, **B**, **C**, **D** (hereafter **A**-**D**). Use these sensors to control the various synthesis parameters, and to store and load presets.

3 **Pitch Shifter** (hereafter + - + -). Use these four sensors to change the pitch of the notes played on the note keyboard, and to adjust the note keyboard's sensors.

4 **HOLD — a sensor-indicator for the parametric keyboard** (hereafter H). Touching this sensor creates a snapshot of the parametric keyboard's current state, which will then be retained and summed with what you play on this keyboard. If you have some already held sensors and press new ones and then press Hold, it adds the new sensors to the existing snapshot saving the timbre "as you hear". To reset the Hold memory, press Hold while sensors **A**-**D** are not pressed. This sensor is also involved in controlling TERRA's functions.

5 **HOLD — a sensor-indicator for the note keyboard** (hereafter H). Touching this sensor while you hold some note sensors, creates a snapshot of the note keyboard, which will then be retained and summed with what you play on this keyboard. Touching this sensor after the note keyboard is released switches on auto replacement mode. The sensor LED will light, indicating that the HOLD function is in the auto replacement mode (it also lights if something

is in the HOLD memory). Press a note or a chord and release the keyboard - it will be held. Press a new note or chord. The old chord will be replaced with the new one automatically. While you press the keyboard in the auto replacement mode the HOLD LED goes off. To switch off the auto replacement mode press the HOLD sensor again while nothing on the note keyboard is pressed. This sensor is also involved in controlling TERRA's functions.

6 **Tuning sensor** (the PITCHFORK sign, hereafter Ψ). Activates tuning of various parameters: individual tuning of the note keyboard's sensors, transposing the whole keyboard, master tune of the synthesizer, choosing a preset tuning for the +‿- +‿-, and for setting up the MIDI output. Also takes part in controlling a few other functions.

The CONTROL zone includes:

7 **The Triangular Indicator-Controller** (hereafter ∴). Indicates and controls various parameters and settings: preset bank, synthesis parameters, note sensor pitch settings, +‿- +‿- settings, selecting a synthesis algorithm, setting the movement sensor's sensitivity, master tuning, MIDI settings etc.

8 **LOAD sensor** (hereafter **L**). With this sensor held down, pressing one of the sensors **A**-**D**, **1**-**12** will load the corresponding preset. Also while holding down LOAD, you can choose a bank on ∴.

9 **SAVE sensor** (hereafter **S**). With this sensor held down, pressing one of the sensors **A**-**D**, **1**-**12** will save the current settings to the corresponding preset. Also with SAVE held down, you can choose a bank on ∴.

10 **ENGINE sensor** (hereafter **E**). Holding down this sensor, you can choose the synthesis algorithm on ∴.

11 **GYROSCOPE, GRAVITATION sensor** (hereafter **G**). Holding it down, you can use ∴ to set the sensitivity of the movement sensor (the built-in accelerometer).

12 **POWER sensor-indicator** (hereafter ⏻). The power indicator, and also a sensor that interrupts release for the note and parametric keyboards.

13 **A knob controlling the envelope release for the parametric keyboard** (hereafter ᴘ⌐).

14 **A knob controlling the envelope release for the note keyboard** (hereafter ⌐).

15 **The Sea knob**, controlling a synthesis parameter of the Water domain (hereafter ≈).

16 **The Sun knob**, controlling a synthesis parameter of the Light domain (hereafter ☼).

17 **The Volume knob** (hereafter ◿).

18 **The TIME parameter knob** on the effects processor (hereafter ◷).

19 **The MIX parameter knob** on the effects processor (hereafter ⤮).

20 **The ECHO sensor-indicator** (hereafter ⏭). Controls the effects processor's mode. **Off** for Reverb, **On** for ECHO.

THE TRIANGULAR INDICATOR-CONTROLLER

Indicates and controls various TERRA settings depending on the interface's current mode.

If no function is activated (default, performance state) — the ∴ controls variations of the current synthesis mode.

With **L** or **S** pressed — **selects the preset bank**.

With **E** pressed — **selects a synthesis algorithm**.

With **G** pressed — **controls the Gyroscope's sensitivity**.

With Ψ pressed — **indicates the pitch of the note sensor pressed**.

With Ψ + ↖H pressed — **selects the +◡- +◡-'s preset**.

With Ψ + **E** (momentarily) pressed — **master tuning of the synth**.

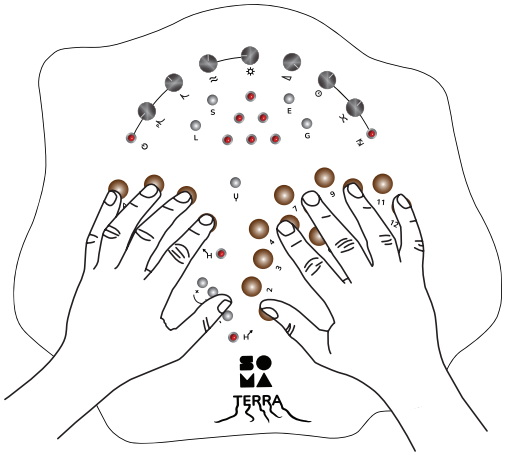
With Ψ + **L** + ↖H pressed — **selects the MIDI output mode**.

In +◡- +◡- tuning mode — **controls the tuning of a current switch combination.**

In USB Flash Drive mode — **selects a preset bank for loading or saving**.

In Calibration mode — **controls the calibration of TERRA's sensors**.

PLAYING TERRA



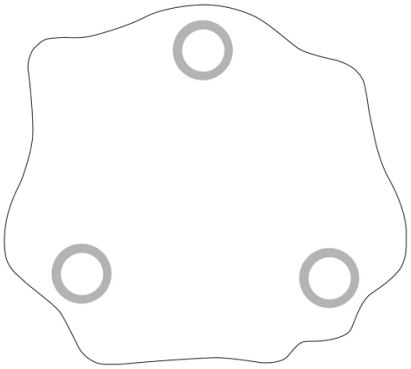
TERRA is an incredibly intuitive and user-friendly instrument to play, allowing for complex, virtuoso parts played with minimal hand motions. It is the only electronic instrument with an interface that is designed entirely around the anatomy of the human hand and its natural range of motions. With acoustic instruments, their parameters are usually strictly defined and limited by the necessary physical parameters of strings, horns, and membranes. Traditional synths have either a piano keyboard, based on the piano's physical parameters, or a rectangular array of buttons that are far from ergonomicin how they're used and perceived.

TERRA's Play Zone is divided in two regions — left-hand and right-hand. The right hand controls the note keyboard, but can also control the left part's sensors when necessary. The left hand's index, middle, ring finger and the pinky control the parametric sensors. One finger for each sensor. The left hand's thumb controls the Pitch Shifter and the HOLD sensors for the parametric and note keyboards. If necessary, the left hand can also control the right region's sensors. Both hands can quickly access knobs and sensors of the Control Zone. Try and get used to such arrangement of hands and fingers. This is especially important for the left hand, where every finger has a control function. This will help you achieve maximum ease, expression and mastery when playing TERRA.

TERRA's dynamic sensors employ a capacitive principle for data capturing, using brass semi-spheres covered in a thin transparent isolating material. The semi-sphere and a finger together form a capacitor whose capacity depends on the size of the contact area. It is important to note that it's the area of the contact—not the amount of pressure - that defines the degree of the sensor's activation. Because of the sensor's surface being semi-circular and a finger being soft, the amount of pressure increases the contact area, which creates a familiar sense of volume depending on the pressure. But it's only up until a certain point that the contact area increases. And when further increasing of the pressure doesn't increase the contact area anymore, there's no more increase in the sensor's activation either. This understanding will make playing TERRA most conscious, effortless and expressive.

TERRA's keyboard is unique for its sensors recognizing a push as well as a hit, distinguishing between them in most algorithms. This allows for wide options in controlling envelopes and timbres by only varying your playing technique on the note sensors.

TERRA is easiest to play in your lap. That way it's easiest to control modulation through the built-in motion sensor — a Gyroscope — reacting to all your body motions. You can also play TERRA on a table. We included special pads you put underneath TERRA in order to still be able to expressively use the motion sensor, as shown in the picture below. This will allow TERRA to move unhampered by the table or any other flat, hard surface you put it on.



To perform a vibrato using the motion sensor, put your palm on TERRA's body and shake it sideways. Remember that the motion sensor is installed into the synth's body, so you have to move the whole of TERRA's body, not just press a sensor sideways.

DESCRIPTION OF FUNCTIONS

LOADING A PRESET

Holding down **L** (LOAD), choose one of the six banks on the , and press one of the sixteen sensors **A**-**D**, **1**-**12**. This loads one of 96 presets. This allows you to change presets very quickly, even on-the-fly playing a part, using it as an artistic device. E.g. you can thus change the scale or pitch of the note keyboard. If a preset loaded is based on the same ENGINE (algorithm) as the one currently loaded into TERRA, the note decays will not be interrupted. TERRA comes loaded with factory presets organized as follows:

Bank 1 — polyphonic sounds in the POLYPHONIC category. Polyphonic synthesis with a traditional polyphonic keyboard.

Bank 2 — polyphonic sounds in the EXPERIMENTAL category. All sorts of experimental, noise and percussive sounds. In most of these presets the keyboard works in an experimental mode divided into three monophonic keyboards.

Bank 3 — monophonic sounds in the BASS category.

Bank 4 — monophonic sounds in the SOLO category.

The rest of the preset banks are empty. If a selected preset is empty, TERRA will indicate that by blinking four times.

It's also possible to load only the sensor tuning from any given preset. To do so, hold down **L**+, choose one of the six banks on the , and press one of the sixteen sensors **A**-**D**, **1**-**12**. It allows loading different scales from different presets, while keeping the other settings as they are. You can save your favorite scales in several presets in a special bank and recall it during a performance or for preset building.

- On loading a preset, the synthesis parameters assigned to the knobs receive their preset values and get "frozen". You can "unfreeze" a parameter for manual control by rotating a knob by at least 10%.
- On TERRA powering up, the last preset saved is automatically loaded.
- All factory presets can be changed or written over.
- The sounds in the BASS category can work as SOLO sounds if the note pitch is duly transposed, and vice versa.

SAVING A PRESET

Holding down **S** (SAVE), choose a bank on and press one of the sensors **A**-**D, 1**-**12**. **H** will start blinking, press it while holding down **S**, to confirm saving. A preset successfully saved is confirmed by blinking twice. This saves TERRA's current settings into one of its 96 presets.

What is saved in a preset:

- The tuning of the note keyboard (can be individual for each of the 96 presets);
- Which of the 24 presets of tuning is used;

- Which of the 32 synthesis algorithms is used and whether the "low sample rate" mode is on;
- The variation of the algorithm used, selected using .
- Settings of .
- Sensitivity of the motion sensor **G**.
-

All presets in all the banks can be written over.

All factory presets can be changed and written over.

If you need to swap the presets' places — use a free preset to temporarily store one of the presets swapped

Holding the sensor **S** for more than 20 seconds deactivates it, this is a hardware limitation. To re-activate, release and press the sensor again.

SELECTING A SYNTHESIS ALGORITHM

TERRA has 32 synthesis algorithms, each of them offering a unique and complete musical instrument on its own.

There are four groups of synthesis algorithms:

POLYPHONIC — polyphonic synthesis with a standard polyphonic keyboard;

EXPERIMENTAL — experimental, noise, percussive polyphonic synthesis. Most of the algorithms use an experimental tri-phonic keyboard, i.e. three mono-keyboards with four sensors in each and a manual portamento. The keyboard is divided into zones as follows: **1**-**4**, **5**-**8**, **9**-**12**.

BASS — monophonic sounds in the Bass category.

SOLO — monophonic sounds in the Solo category.

To switch a synthesis algorithm, hold **E** (ENGINE) and set one of the 64 combinations on .

The middle row of sensors select one of the four algorithm groups:

— POLYPHONIC, — EXPERIMENTAL, — BASS, — SOLO.

a combination of sensors from the bottom row selects one of the 8 algorithms from the previously selected group.

the top sensor engages a low sample rate mode for any algorithm selected. Turning this sensor on halves the entire DSP-clock into 22 KHz, including all synthesis, all filters, all envelopes, LFOs, and all the FX processing — which means the Echo and Reverb tails' time will double. In short: everything becomes twice lower, slower, bigger and bassier.

See the ALGORITHMS section for a detailed description of all synthesis algorithms, their individual features and settings.

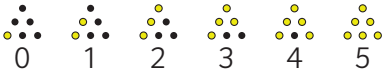
SELECTING A VARIATION FOR A SYNTHESIS ALGORITHM

When TERRA is in play mode — i.e. no tuning or calibration functions are activated and none of the control sensors **L S E G** Ψ, are pressed — you can switch the current synthesis algorithm by selecting one of its 64 variations on ∴.
This is TERRA's main working mode immediately after powering up, and it remains so unless any control sensors are pressed.

Switching variations while notes are still playing can lead to minor audible clicks.

SETTING THE GYROSCOPE'S SENSITIVITY

Hold down **G** and use ∴ to set the motion sensor Gyroscope's sensitivity, from completely off to the maximum.



In most algorithms, the Gyroscope modulates the pitch of the notes played and the Echo's delay time, thus creating frequency modulation.

Holding down the **G** sensor for more than 20 seconds deactivates it, this is a hardware limitation. To re-activate, release and press the sensor again.

CONTROLLING THE ENVELOPES

TERRA has two knobs and one sensor for controlling the decay of the envelopes of the parametric and note keyboard sensors.

PL — envelope decay time of the parametric keyboard sensors.

In certain algorithms, some sensors have an uncontrollable envelope decay time close to 0.

L — envelope decay time of the note keyboard sensors.

⏻ — fast envelope decay for note and parametric keyboards. Pressing this sensor is equal to setting the PL L knobs to 0. On releasing the sensor, the decay time returns to initial settings. This sensor also decreases the Reverb size and the number of Echo repeats.

Holding down the ⏻ sensor for more than 20 seconds deactivates it, this is a hardware limitation. To re-activate, release and press the sensor again.

There are no control knobs for the attack envelopes; you can control those by the way you touch the sensors. Slowly pressing a sensor produces a soft attack; a quick pressing or a hit creates a fast attack.

≈ AND ☼ KNOBS

These two knobs have various functions depending on the algorithms.

≈ — SEA. Controls parameters we classify as belonging to the Water domain: e.g. LFO speed or detune beats.

☼ — SUN. Controls parameters we classify as the Light domain: e.g. the drive or the amount of high-frequency harmonics.
See each algorithm's detailed description to learn the respective functions of the two knobs.

THE FX PROCESSOR

TERRA has a spatial effects processor unit that works in Reverb or Echo mode.

TIME. Decay time in Reverb mode; delay time in Echo mode.

MIX. Balance of dry and wet signals.

ECHO. **On** engages the Echo mode, **Off** is Reverb mode.

Echo and Reverb each have their individual memory units. With longer TIME values, you can use this feature to store sound fragments. You can play several notes in Echo mode, then switch to Reverb and play it for some time, then switch back to Echo mode — and the Echo's buffer content will remain the same as when you switched out of it.

However, if you don't need the effects' old memory content when switching them, you can delete it. To delete an inactive mode's memory content, hold down **G** and press . An inactive mode's memory content is also deleted when a synthesis algorithm is switched.

TUNING THE NOTE KEYBOARD

To tune each sensor individually:
Hold down , and one of the **1**-**12** sensors that you want to tune. Simultaneously use , to tune the sensor to desired pitch.

— tuning in semitones (big step).
Pressing the **+** sensor once will raise the note's pitch by one semitone.
Pressing the **-** sensor once will lower the note's pitch by one semitone.
Holding the **+** will gradually raise the pitch in semitones.
Holding the **-** will gradually lower the pitch in semitones.

Any switching in semitones resets the sensor's microtonal adjustment to zero.

+ - — microtonal tuning (small step).
Pressing the **+** sensor once will raise the note's pitch by 0.8% of a semitone.
Pressing the **-** sensor once will lower the note's pitch by 0.8% of a semitone.
Holding the **+** will gradually raise the pitch.
Holding the **-** will gradually lower the pitch.

During the tuning, the current sensor's pitch will be indicated on .

A lit top LED on the always means #.

The current note's octave is not indicated.

A LED blinking in 's bottom row indicates that there's a microtonal tuning lower than the chromatic note indicated. The faster the blinking, the wider the microtonal interval.

A LED blinking in 's middle row indicates that there's a microtonal tuning higher than the chromatic note indicated. The faster the blinking, the wider the microtonal interval.

It is also possible to tune the sensors using a MIDI keyboard. Connect a MIDI keyboard to TERRA MIDI IN. Hold down and the sensor you want to tune and press the necessary key on the MIDI keyboard. The MIDI channel doesn't matter. This operation resets the sensor's microtonal adjustment to zero.

It's possible to set TERRA's keyboard to natural tuning (just intonation). For that, hold down , AND the note keyboard sensor that is the tonic note — and simultaneously press the following sensors on the Triangular Controller: . TERRA will indicate a successful conversion by blinking twice.

During the conversion, the tonic that you set will be used to calculate the natural tuning's integer fractions according to which the note keyboard will be re-tuned.

During the natural tuning conversion, the microtonal adjustment for the tonic sensor will be ignored and reset to zero.

<u>To transpose all of the note keyboard:</u>
Holding down and simultaneously, use + - + - to transpose the keyboard to the desired pitch.

+ - — transposing in octaves (big step).
Pressing the **+** sensor raises the keyboard's global pitch by 1 octave.
Pressing the **-** sensor lowers the keyboard's global pitch by 1 octave.
Holding down **+** will gradually raise the keyboard's pitch in octaves.
Holding down **-** will gradually lower the keyboard's pitch in octaves.

+ - — transposing in semitones (small step).
Pressing the **+** sensor raises the keyboard's global pitch by 1 semitone.
Pressing the **-** sensor lowers the keyboard's global pitch by 1 semitone.
Holding down **+** raises the keyboard's pitch gradually in semitones.
Holding down **-** lowers the keyboard's pitch gradually in semitones.

Transposing the entire note keyboard does not change the microtonal adjustment of the sensors.

always tunes in big steps (semitones or octaves).
always tunes in small steps (microtonally or in semitones).

To initialize the tuning of the note keyboard:

Simultaneously press all 4 sensors , then simultaneously add .
Release , then release . The keyboard will be initialized into chromatic scale where sensor **1** is the C note. Microtonal adjustments for all sensors will be 0.

To store a keyboard tuning you created, save it to any preset. Each of the 96 presets can have its own individual keyboard tuning.

Tuning the sensors is so quick and easy that you can do it on-the-fly during your performance, using it as an artistic device or for creating a scale while playing.

USING WHILE PLAYING

The Pitch Shifter ( ) lets you instantly transpose the notes played on TERRA. The resulting note pitch equals the sensor's tuning plus the interval set by the 's current combination. To shift the pitch of a note played, **before** you press it, press and hold one or several 's sensors. I.e. the combination of sensors should be already held down while pressing a note on the **1**-**12** note keyboard. Adjusting does not change the notes already pressed. See the last section of this manual for a table of factory tuning presets.

Any combination of sensors pressed can be tuned to its own interval. In total, you can shift the pitch of the notes played into 16 various intervals (including the also tunable "nothing-pressed" state).

The "nothing-pressed" state in all the factory presets is tuned to zero. If the "nothing-pressed" state is tuned to a non-zero interval, all of the keyboard in its initial state will be shifted by that interval. Be careful!

SELECTING A PRESET

When you hold and (keyboard transposing mode), indicates the . preset and can be used to change it. The three top sensors on indicate the bank, the bottom three indicate the preset's number in it.

To select a bank, press one of the top three sensors. There are three preset banks available for the Pitch Shifter.

To select a preset number inside a bank, dial in one of the eight combinations on the three bottom sensors. There are eight presets available in each bank. That makes it a total of 24 tuning presets.

A table of factory tuning presets is presented in the last section of this manual. Factory presets are only stored in the first bank. The rest of the presets are empty. With an empty preset loaded, pressing does not affect TERRA's performance.

TUNING A PRESET

Holding down on the, select a preset that you want to tune, as described in the previous section. Press simultaneously (the combination is deliberately made complex to avoid accidentally entering this mode during a concert).

TERRA is now in tuning mode. A constant C note is now playing (you can adjust its volume with). Along with it, there's a second, brighter and louder note which indicates the 's current state and changes if you press various combinations on. That way you can control the tuning by ear.

Press and hold on the combination you want to tune ("nothing pressed" is also tunable).

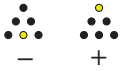
To tune a current combination in semitone steps, use **1**-**12**. **1**= unison. **2**= +1 semitone, **3**= +2 semitones, ...**12**= +11 semitones.

To tune a current combination in octave steps, use **L** and **G**. **L** = –1 octave. **G** = +1 octave.

To tune a current combination microtonally, use **S** and **E**. **S** = –0.8% of a semitone. **E** = +0.8% of a semitone. A long pressing changes the tuning gradually.

The octave and microtonal tunings are indicated on.
Octave tuning

Microtonal tuning (The LED blinks: the faster the blinking, the wider the microtonal interval)



Any change done to octave or microtonal tuning resets the microtonal adjustment to zero.

To convert a current interval tuning of into just intonation, simultaneously press on the Triangular Controller the following sensors.

The "nothing-pressed" state on all factory presets is tuned to zero. If the "nothing-pressed" state is tuned to a non-zero interval, the entire keyboard in its initial state will be shifted by that interval. Be careful!

To tune down to an interval less than an octave, use -1 octave + the tuning in semitones. E.g., a semitone down equals -1 octave +11 semitones.

The maximum interval that + - + - can shift to is -36/+47 semitones.

To save the + - + - settings into current preset and exit, press Y H.

To exit without saving, press H H.

SYNCHRONIZING THE LFO AND ARPEGGIATOR TEMPO

Some of TERRA's algorithms have a rhythmic LFO or an arpeggiator, calling for their tempo to be synchronized with that of a song. There are four ways to do that.

1. Carefully adjusting the tempo with the ≈.

2. Holding down the **D** sensor, tap the tempo on the Y. This "freezes" the ≈ knob. To return it to function, rotate it by 10% or more.

3. Sending MIDI clock to the MIDI input. When it registers an external MIDI clock, TERRA will automatically switch to synchronization by MIDI. The ≈ knob will then adjust the subdivision quotient for the MIDI clock received, thus defining the note length.

4. Sending CV clock via the MIDI input. When it registers an external CV clock, TERRA will automatically switch to synchronization by CV clock. The ≈ will then adjust the subdivision quotient of the clock received, thus defining the note length. Connecting the CV clock is described in the Connecting TERRA section.

LFO and arpeggiator restart automatically by touching the note keyboard if no note sensor has been pressed.

MIDI OUTPUT

TERRA has MIDI output, enabling you to use its innovative interface and keyboard as a unique MIDI controller for other synths. In this mode TERRA keeps synthesizing sounds. It should be noted that TERRA was designed as a standalone synthesizer first-and-foremost, and as a MIDI controller secondly. For this reason, we allowed for some compromises in the MIDI out features, so that including MIDI functionality would not constrain or limit TERRA's synthesis.

Controlling the MIDI Output mode in TERRA is done with ⁘.
To switch to MIDI Control mode, press and hold down **L** Y H.

— These two sensors set the mode that the MIDI output works in. In this state the MIDI output is off. This is the default state when you turn on TERRA, and which it returns to when turned off.

— The **A**-**D**, **1**-**12** sensors are transmitted as CC messages, the Gyroscope as pitchbender.

— **A**-**D** as CC messages, **1**-**12** as notes with velocity, Gyroscope as pitchbender.

— MPE Mode (MIDI Polyphonic Expression).

TERRA's Interface as a group of CC controllers.
In this mode, you can use TERRA as 16 high-sensitivity controllers for controlling MIDI instruments.

The sensors are assigned as follows:
A — CC16 **1** — CC20 **5** — CC24 **9** — CC28
B — CC17 **2** — CC21 **6** — CC25 **10** — CC29
C — CC18 **3** — CC22 **7** — CC26 **11** — CC30
D — CC19 **4** — CC23 **8** — CC27 **12** — CC31

The Gyroscope's X axis is assigned to Pitch Bend.

Transmission of all MIDI messages is done on the channel you select (see below).

TERRA's interface as note MIDI controller.
In this mode you can use TERRA's unique interface to play another synthesizer.

The sensors are assigned as follows:
A — CC16
B — CC17
C — CC18
D — CC19

The notes played on **1**-**12** are transmitted as Note On/Off MIDI messages with Velocity. The notes' pitches combined with +‿- +‿- are included, while microtonal adjustments are not. The **1**-**12** tuning and polyphony are equal to those of the preset (algorithm) selected.

The state of each sensor 1-12 is transmitted as Polyphonic Aftertouch.

The Gyroscope's X axis is assigned to Pitch Bend.

Transmission of all MIDI messages is done on the channel you select (see below).

This mode works the best with algorithms in the POLYPHONIC group. In algorithms from other groups, notes will be sent with a fixed velocity of 127, regardless of pressure strength and speed. Of course this may be useful in some cases. Also, during note transmission without velocity the sensors will react faster, as there's no need to wait for the sensor's value to reach its maximum, which can take up to 15 ms.

In algorithms containing the monophonic keyboard setup, the polyphony of MIDI messages sent equals 5 voices; 12 voices for tri-phonic keyboard; 12 for arpeggiator. The arpeggiator's work is not transmitted via MIDI.

TERRA's interface as a notes MIDI controller in MPE mode.
In this mode, you can play an MPE-compatible synthesizer through TERRA's unique interface, using the features of MIDI Polyphonic Expression.

The sensors are assigned as follows:
A — CC16
B — CC17
C — CC18
D — CC19
and transmitted through the Master Channel (Channel 1).

The notes played on **1**-**12** — including their tunings with the microtonal adjustment, and combined with + - + - and its microtonal adjustment — are transmitted as MPE messages in the following format:

- Each note is transmitted on its MIDI channel (Channels 2-13).
- Velocity of transmitted notes is 127.
- The state of each sensor is transmitted as Channel Pressure (Aftertouch) on the channel of the note that it plays.
- The integer part of the note's pitch is transmitted as MIDI note number.
- The microtonal component of each note is transmitted as Pitch Bend message on that note's channel. **To correctly transmit the microtonal component, Pitch Bend should be set up for +/-48 semitones range on the controlled synth.**

The tuning of **1**-**12** and the polyphony equals the polyphony of the preset (algorithm) selected. In algorithms containing a monophonic keyboard, the polyphony of MIDI messages transmitted equals 5 voices; 12 voices for tri-phonic keyboard; 12 voices for the arpeggiator. The arpeggiator's work is not transmitted via MIDI.

The Gyroscope's X axis is assigned to the Master Channel's (Channel 1) Pitch Bend.

The MIDI Channel number selected on the is ignored in MPE mode.

The MIDI output's work mode is not stored into power-independent memory and will equal "MIDI Output Off" when TERRA is powered up. There's a reason for that: forming a MIDI output takes processing power, which slows down TERRA's sensors by 1-2 ms. So, to avoid MIDI output staying on unnecessarily, it is off by default.

Knobs as MIDI controllers:
In all MIDI modes TERRA's knobs send CC messages. The knobs are assigned as follows:
P — CC102
— CC103
— CC104
— CC105
— CC106
— CC107

Setting the MIDI Channel number for transmitting MIDI messages:
A combination of these four sensors  is used to set the outgoing MIDI Channel, while holding **L** Ψ↰**H**.
The MIDI Channel number equals the sum of the numbers near the lit sensors plus one (+1).
Examples:


Channel 1 (0+1)

Channel 5 (4+1)

Channel 10 (1+8+1)

Channel 16 (1+2+4+8+1)

The MIDI Channel number is stored into power-independent memory, and the next time TERRA is powered up, it will keep the MIDI Channel number set previously. For the MIDI Channel number to get stored, please allow 5 seconds between exiting the MIDI Control mode (**L** Ψ↰**H**) and powering off the instrument.

MASTER-TUNE

To adjust the synthesizer's global pitch, press and hold Ψ and momentarily press **E**. While holding Ψ, use sensors **+** and **-** of + - or + - to tune the synthesizer if necessary. The pitch shift will be indicated by ∴. Its top sensor lit up will indicate zero shifting (the A=440 Hz standard tuning).

To reset tuning to zero, touch the top sensor.

Master tuning is stored into power-independent memory and will remain the same the next time TERRA is powered up. For the tuning to get stored, please allow 5 seconds between exiting the tuning mode (Ψ) and powering off the instrument.

UPDATING THE FIRMWARE

To update the firmware, download its latest version at somasynths.com → INSTRUMENTS → TERRA → FIRMWARE https://somasynths.com/terra_firmware/ https://somasynths.com/terra_firmware/ and put the software into the root folder of your USB stick drive. FAT32 file system required. We don't recommend using large capacity stick drives. 1 – 32 GB are perfect. Don't put several different versions of the firmware into the root directory. If the USB stick is damaged or not compatible with TERRA, all six LEDs of the ∴ will light up. Switch off TERRA and replace the USB stick.

Insert the USB stick drive into TERRA's USB slot and power the synth on. Press and hold **L E**. ↰**H** will start blinking. While holding down **L**, press ↰**H**. The ∴'s sensors lighting up circularly will indicate a successful update. If the USB drive doesn't have a valid firmware file, on pressing **L E** the ∴ will blink once. If the update fails, ∴ will blink incessantly until TERRA is powered off. If this occurs, power TERRA off and back on, and repeat the update procedure. Try downloading the firmware file again, reformatting your USB stick, and lastly try another USB stick if it still won't update correctly.

On finishing the update, remove the USB stick drive. Process complete, you can now enjoy your TERRA with the latest firmware version.

With the USB stick drive inserted, the synthesizer is in USB drive mode and unavailable for playing.

SAVING PRESETS TO A USB DRIVE

TERRA can save to or load from a USB stick drive one preset or all 96 presets, along with 24 Pitch Shifter adjustments.

To start working with a USB stick drive, insert it into the USB slot and power up the synth.

To save one preset to a USB stick drive:
Holding down **S**, select a bank on ⁘ and use one of the sensors **A**-**D**, **1**-**12** to select the preset you want saved to the USB stick. **H** will start blinking. Without releasing **S** , press **H**.
The preset will be saved, indicated by ⁘'s sensors lighting up circularly. The name of the file saved to the USB stick will follow the template: TER_B(bank)P(preset).smp.

To load one preset from a USB stick drive:
Holding down **L**, select a bank on ⁘ and use sensors **A**-**D**, **1**-**12** to select the preset into which you want to load a preset from a USB drive. **H** will start blinking. Without releasing **L**, press **H**.
The preset will be loaded, indicated by ⁘'s sensors lighting circularly. The first file that fits (i.e. has a filename TER_B*P**.smp) will be loaded from the USB stick. If no compatible file is found on the USB stick, TERRA will indicate that by ⁘ blinking once.

To save one preset of +‿- +‿- to a USB stick drive:
Holding down **S** Y, select a bank and a preset of +‿- +‿- on ⁘ to select the preset you want saved to the USB stick. **H** will start blinking. Without releasing **S** Y, press **H**.
The preset will be saved, indicated by ⁘'s sensors lighting up circularly. The name of the file saved to the USB stick will follow the template: TER_PS(bank)N(preset).smp.

To load one preset of +‿- +‿- from a USB stick drive:
Holding down **L** Y, select a bank and a preset of +‿- +‿- on ⁘ to select the preset into which you want to load a preset from the USB drive. **H** will start blinking. Without releasing **L** Y, press **H**.
The preset will be loaded, indicated by ⁘'s sensors lighting up circularly. The first file that fits (i.e. has a filename TER_PS*N*.smp) will be loaded from the USB stick. If no compatible file is found on the USB stick, TERRA will indicate that by ⁘ blinking once.

To save all of TERRA's memory content onto a USB stick drive:
Holding down **S**, press **G**. **H** will start blinking. Without releasing **S** **G**, press **H**.
Memory saving will begin, indicated by ⁘'s sensors lighting up circularly. The name of the file saved will follow the template: TERRA___.smp.

All 96 presets and 24 Pitch Shifter settings will be saved to the USB stick drive.

To load all of TERRA's memory content from a USB stick drive:
Holding down **L**, press **G**. H will start blinking. Without releasing **L G**, press H.
The memory content will start loading into TERRA, indicated by ∴. 's sensors lighting up circularly. The first found file with a name TERRA_**. smp will be loaded, where ** is any symbols acceptable in filenames you can use to mark the file to tell it apart. If no compatible file is found on the USB stick drive, TERRA will indicate that by ∴ blinking once.

All 96 presets and 24 Pitch Shifter settings will be loaded from the USB stick.

FAT32 file system required. We don't recommend using large-capacity USB sticks. 1-32 GB sizes are perfect.

Once the file transfer is complete, power off TERRA and remove the USB stick. Turn TERRA back on, and it's back in the regular working mode ready for playing music.

CALIBRATION

TERRA allows the individual calibration of the dynamic sensors **A**-**D**, **1**-**12**. What's calibrated is the capacitance (contact area), to be read as 100% velocity. TERRA comes factory calibrated to work with an average hand size.
It is highly recommended that you **avoid recalibrating the sensors without a real necessity! Improper calibration will have a negative impact on the functioning of the dynamic sensors**.
Still, in some cases, a recalibration of all or some of the sensors might make sense — e.g. if your hands are very small or very large.

To enter calibration mode, press **S L E** simultaneously. ∴ blinking twice will indicate you're now in calibration mode.

To calibrate a sensor, press on its top evenly with your pinky, with a force that you want to set as 100% velocity. This maximum capacitance value will be registered. If the sensor is released and pressed again, the calibration process will repeat. Use this method to calibrate all sensors required. ∴ will indicate the current value of the calibrated sensor's capacitance.

The pinky is best used for calibration because it's the smallest finger with least capacitance. If the sensor can reach 100% velocity when pressed by your pinky, it will work with all your fingers.

Important! In calibration mode, TERRA must be connected to external sound equipment, e.g. a mixer or an amplifier. The body of the person doing the calibration must not touch any items or TERRA's sensors — except the sensor you are calibrating. That also means not standing barefoot on ground, sand or a wet surface. These are necessary conditions for setting the right capacitance.

To save the calibration results and exit, press H. Only the sensors touched during the calibration will be changed and saved. TERRA will indicate that by ∴ blinking twice.

To exit the calibration mode without saving, press H.

DESCRIPTION OF THE SYNTHESIS ALGORITHMS

THE BASICS

TERRA has 32 synthesis algorithms, each of them a complete musical instrument. The algorithms are divided into 4 groups with 8 algorithms each.

POLYPHONIC — polyphonic synthesis with a standard polyphonic keyboard;

EXPERIMENTAL — experimental, noise, percussive polyphonic synthesis. Most of the algorithms use an experimental tri-phonic keyboard, i.e. three mono-keyboards with four sensors in each and a manual portamento. The keyboard is divided into zones as follows: **1**-**4**, **5**-**8**, **9**-**12**.

BASS — monophonic sounds in the Bass category.

SOLO — monophonic sounds in the Solo category.

To change a synthesis algorithm, hold **E** (ENGINE) and dial one of 64 combinations on .

The middle row sensors can set one of the four algorithm groups:
— POLYPHONIC, — EXPERIMENTAL, — BASS, — SOLO.

a combination of switched-on bottom row sensors selects one of eight algorithms from a selected group.

The top sensor enables a "low sample rate" mode for any selected algorithm. Turning this sensor on halves TERRA's global DSP clock, including all synthesis, all filters, all envelopes, LFOs, as well as the FX processing — which doubles the sizes of Echo and Reverb. Everything sounds twice lower, slower and bassier.

The knobs each perform the same individual function through all algorithms, except in a few specified cases. Those functions are described in Controlling the Envelopes and FX processor sections.

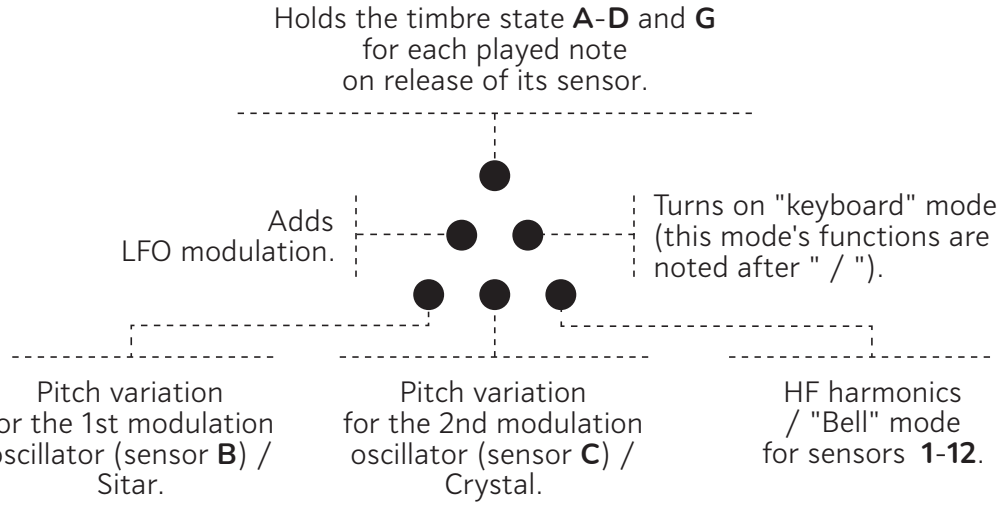
The knobs are given specific descriptions for each algorithm.

If an algorithm has less significant and more significant control sensors, their on-off combinations produce 4 levels of a given parameter: 00 = 1, L0 = 2, 0M = 3, LM = 4 (L = less significant, M = more significant, 0 = off).

Often the **A**-**D** sensors or knobs control several synthesis parameters at the same time, interacting in a non-linear fashion. That effect would be impossible to describe without diving pages deep into synthesis theory. Therefore, often describing a function makes it no easier to understand what it does. Take this as an invitation to explore, to experiment. Try various setting combinations while exploring each algorithm. TERRA has many secrets and surprises for you to unearth :)

POLYPHONIC ALGORITHMS GROUP

A family of sounds inspired by acoustic and electro-acoustic instruments: plucked, bowed, reed, hammered.



A — Pitch down until oscillators' full stop.
B — Depth of modulation by the 1st modulation oscillator.
C — Depth of modulation by the 2nd modulation oscillator.
D — Depth of "LYRA-style" modulation.

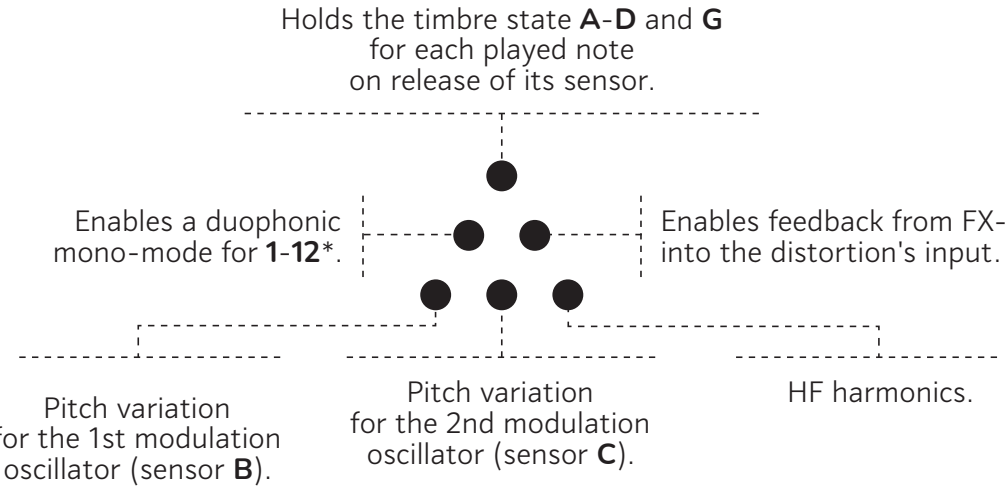
≈ — LFO Frequency.

☼ — Attack brightness.

Gyroscope: X — notes pitch modulation, Y — Echo delay time modulation.

11-voice polyphony.

An ecstasy in the realm of distortion, embraced tightly by a resonance low-pass filter.



A — Pitch down until full stop / transition to duophonic mode of **1**-**12**.
B — Depth of modulation by the 1st modulating oscillator.
C — Depth of modulation by the 2nd modulating oscillator.
D — Opens the LPF.

≈ — LPF's resonance.

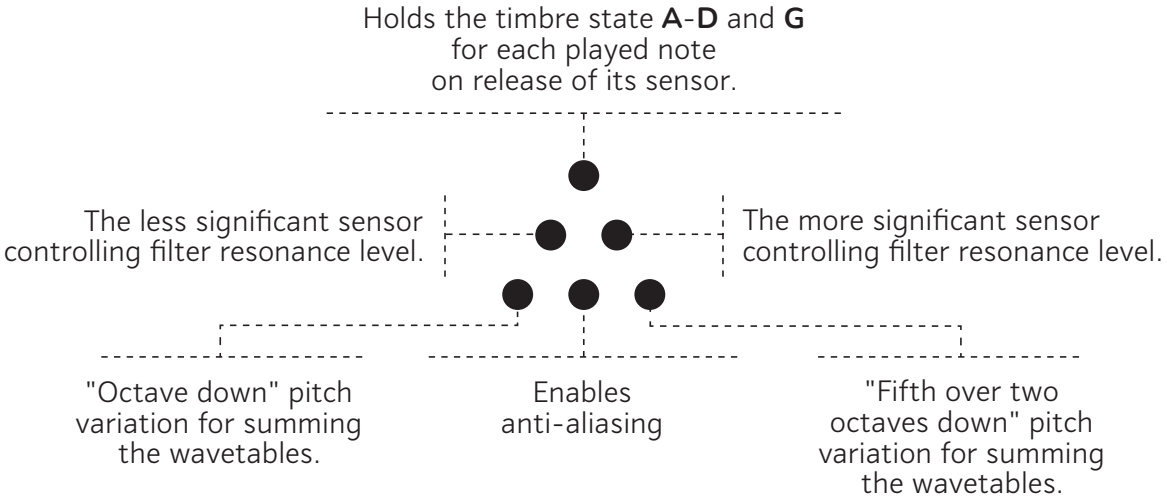
☼ — Distortion gain.

Gyroscope: X — notes pitch modulation, Y — Echo delay time modulation.

12/2-voice polyphony.

* A unique duophonic mode, in which the lowest note is isolated, and the rest of the notes performed are merged into one note via an algorithm of monophonic mode with a smart glissando controlled by order and strength of pressing the sensors.

The 80's sweet dreams, inspired by a small CASIOTONE synth.



A — Chorus.
B — Depth of modulation of wavetables selector by LFO signal.
C — The filter's first component.
D — The filter's second component.

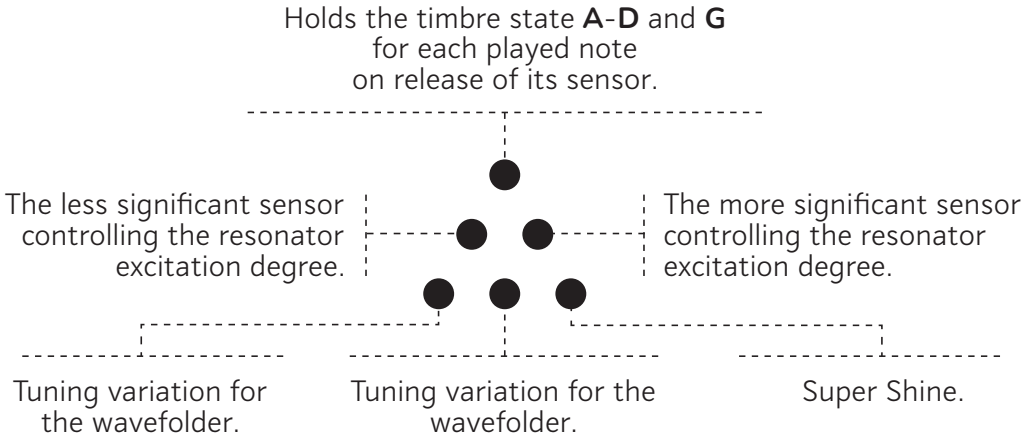
≈ — The LFO frequency.

☼ — Selecting a wavetable.

Gyroscope: X — notes pitch modulation, Y — Echo delay time modulation.

8-voice polyphony.

Warm rays of detuned saws through resonator prisms.



A — Sidechain-like mute.
B — First resonator frequency.
C — Second resonator frequency.
D — Triangle → Saw

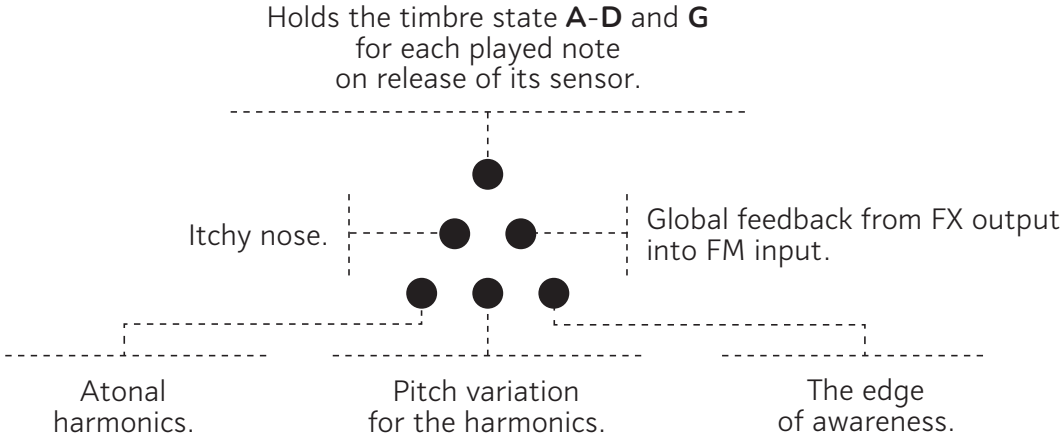
≈ — Oscillator detune.

☼ — Shine.

Gyroscope: X — notes pitch modulation, Y — Echo delay time modulation.

10-voice polyphony.

A realm of meditative singing bowls and bells.



A — Pitch down until full stop.
B — Amplitude modulation by LFO signal.
C — Beyond good and evil.
D — The Wheel of Samsara.

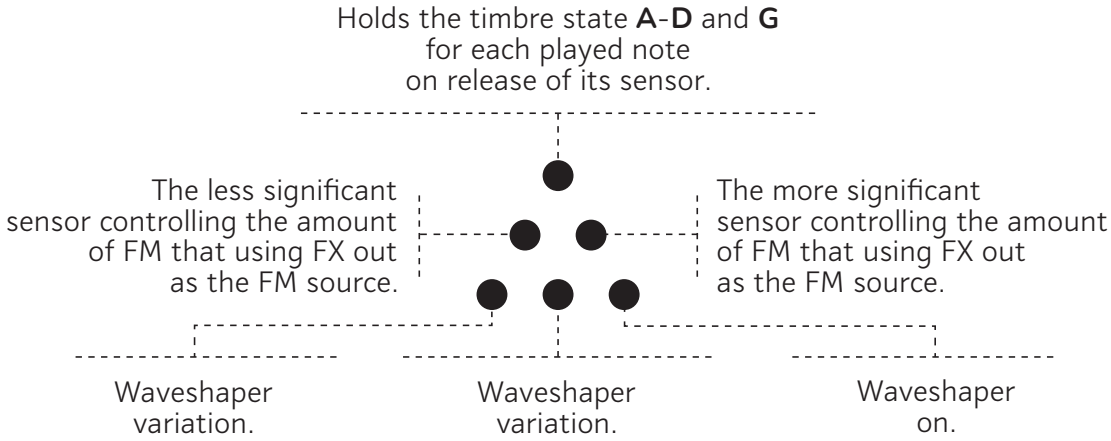
≈ — LFO frequency.

☼ — Distortion gain.

Gyroscope: X — notes pitch modulation, Y — Echo delay time modulation.

10-voice polyphony.

An exalted synthesis, inspired by church organs.



A — Pitchbender merging all notes into the lower one.
B — Octave down.
C — Octave up.
D — Triangle → Saw.

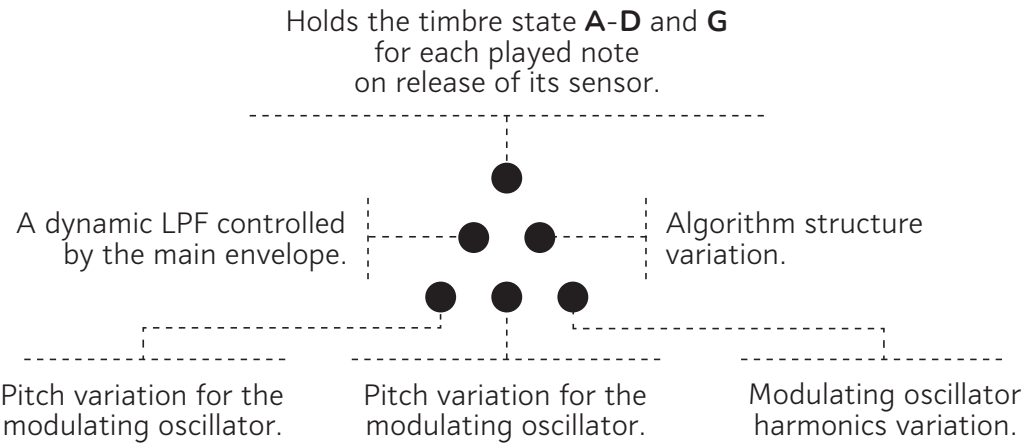
≈ — Portamento.

☼ — Waveshaper drive.

Gyroscope: X — notes pitch modulation, Y — Echo delay time modulation.

9-voice polyphony.

A combination of FM + wavefolder + HPF in a feedback loop.



A — Transition into duophonic mode. *
B — Depth of modulation by the modulating oscillator.
C — Waveshape + feedback.
D — HPF frequency.

≈ — LPF resonance / Attack → HF harmonics.

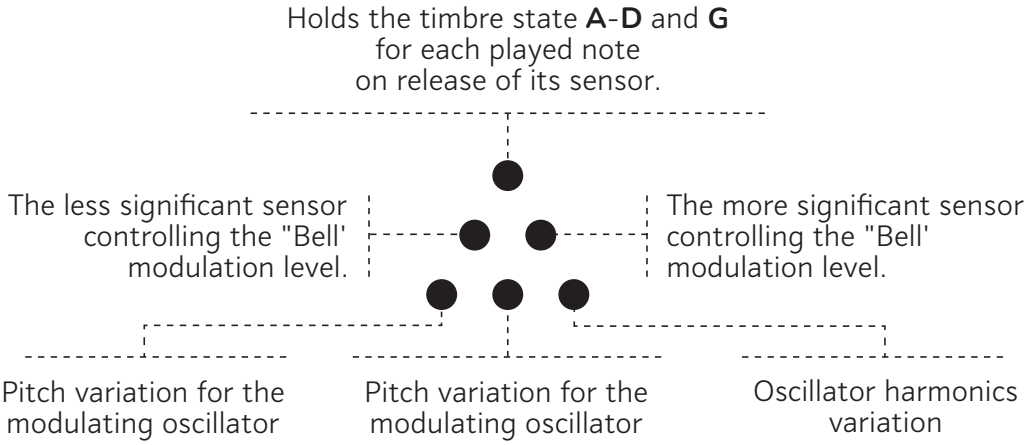
☼ — the drive gain for the oscillator-wavefolder-HPF chain.

Gyroscope: X — notes pitch modulation, Y — Echo delay time modulation.

9-voice polyphony.

* A unique duophonic mode, in which the lowest note is isolated, and the rest of the notes performed are merged into one note via an algorithm of monophonic mode with a smart glissando controlled by order and strength of pressing the sensors.

A synthesis mode prominently using the modulation of various parameters by noise.



A — An octave-up pitchbender.
B — Waveshaper.
C — Noise transformer.
D — Noise modulator.

≈ — Depth of modulation by the modulating oscillator.

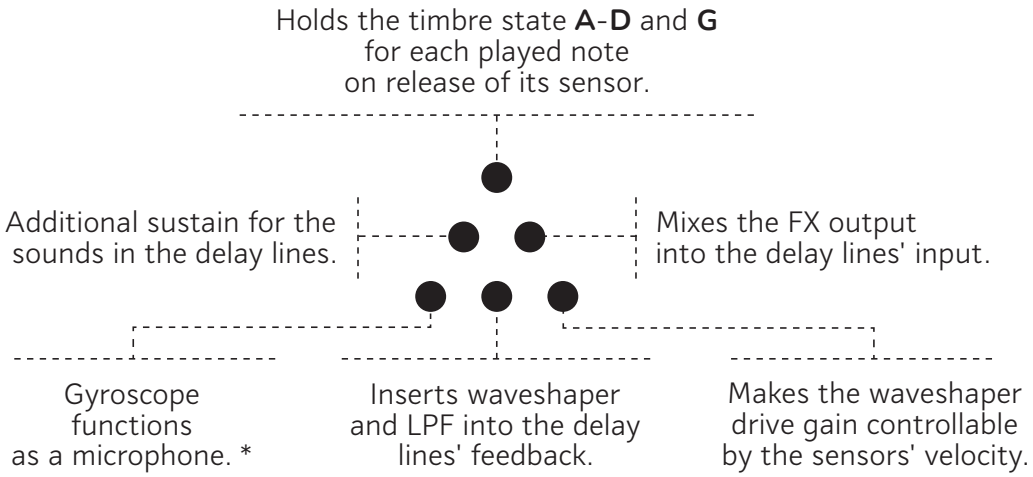
☼ — HF harmonics of the main oscillator.

Gyroscope: X — notes pitch modulation, Y — Echo delay time modulation.

6-voice polyphony.

EXPERIMENTAL ALGORITHMS GROUP

A unique oscillatorless algorithm! Notes born from feedback, fed through bandpass filters, accumulated in the delay lines. It's like a mic feeding back at the show, but we've taught it to play by notes. For feedback seeding, the delay lines are fed a quiet noise or a sawtooth-shape signal if the **D** sensor is pressed.



* A unique mode where the built-in Gyroscope acts as a microphone with very special characteristics, picking up sound from TERRA's body.

Most of the ∴ settings in this algorithm are very subtle, their effect noticeable only during a long performance period. This mysterious algorithm is for the sound experimenters out there.

A — Sidechain-like mute.
B — Waveshaper.
C — Closes the LPF.
D — Adds sawtooth to the "seed signal" in the delay lines.

≈ — Delay lines length.

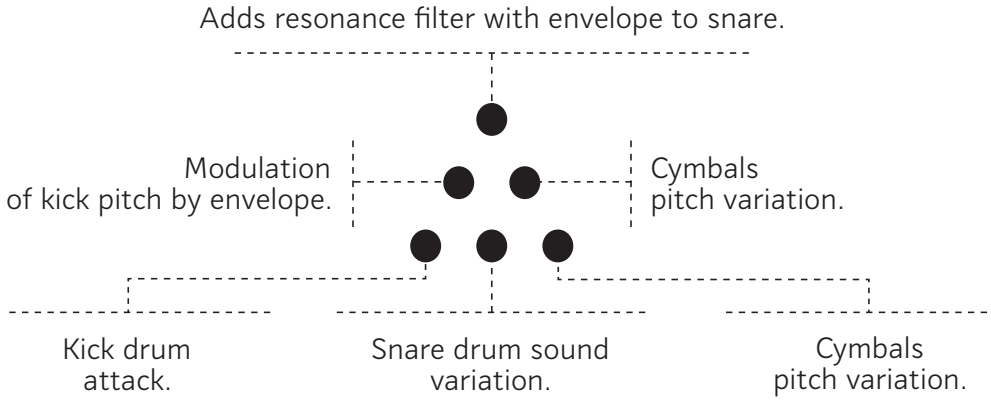
☼ — Delay lines feedback.

Gyroscope: X — modulates the delay line time; Y — modulates the frequency of the seed sawtooth.

In this algorithm, the FX processor only works in Reverb mode, as the Echo's memory is used for the delay lines.

3-voice polyphony. This algorithm uses a unique tri-mono-mode on the **1**-**12** keyboard, dividing it into three mono-zones: **1**-**4**, **5**-**8**, **9**-**12**. Every mono-zone has an individual smart glissando controlled by the sequence and strength of pressing the group's sensors.

A drum kit. Kick, snare and cymbals, all synthesized, no samples used.



A — mute.
B — BD pitchbend 1 octave down.
C — SD pitchbend 1 octave up.
D — Hi-hat pitchbend 1 octave up.

P — Kick decay.

— Snare decay.

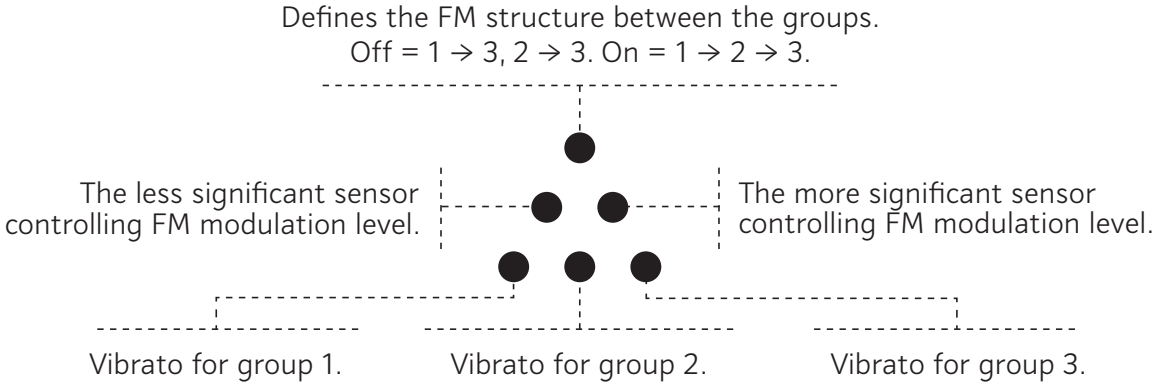
— Hi-hat decay.

— Distortion gain.

Gyroscope: X — notes pitch modulation, Y — Echo delay time modulation.

3-voice polyphony. This algorithm uses a unique tri-mono-mode on the **1**-**12** keyboard, dividing it into three mono-zones: **1**-**4**, **5**-**8**, **9**-**12**. Every mono-zone has an individual smart glissando controlled by the sequence and strength of pressing the group's sensors.

FM synthesis, with each of the three mono-groups working as a separate controllable operator inside the FM synthesis.



A — Closes the LPF.
B — HF harmonics for group 1.
C — HF harmonics for group 2.
D — HF harmonics for group 3.

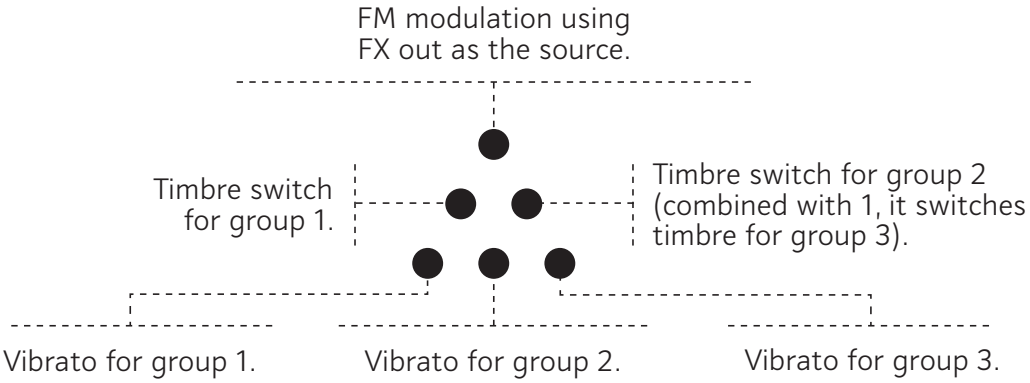
≈ — Vibrato frequency.

☼ — LPF resonance.

Gyroscope: X — notes pitch modulation, Y — Echo delay time modulation.

3-voice polyphony. This algorithm uses a unique tri-mono-mode on the **1**-**12** keyboard, dividing it into three mono-zones: **1**-**4**, **5**-**8**, **9**-**12**. Every mono-zone has an individual smart glissando controlled by the sequence and strength of pressing the group's sensors.

Three mono-synthesizers controlled by a tri-monophonic keyboard.



A — Closes the LPF.
B — HF harmonics for group 1.
C — HF harmonics for group 2.
D — HF harmonics for group 3.

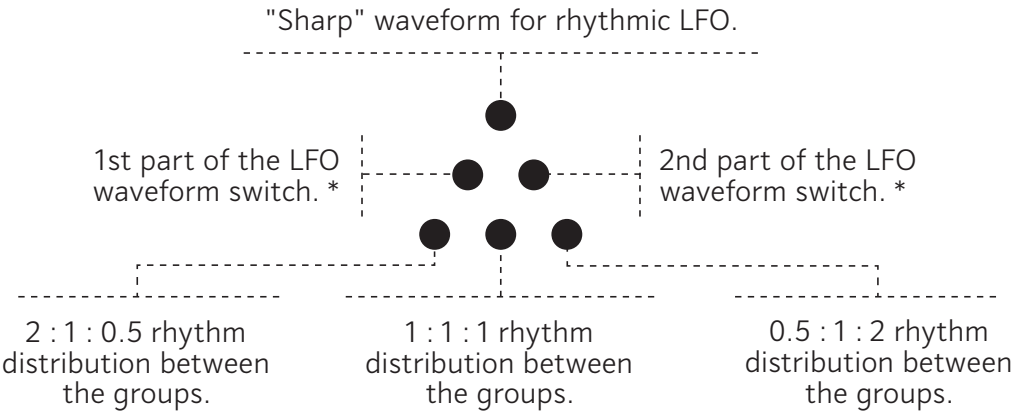
≈ — Vibrato frequency.

☼ — LPF resonance.

Gyroscope: X — notes pitch modulation, Y — Echo delay time modulation.

3-voice polyphony. This algorithm uses a unique tri-mono-mode on the **1**-**12** keyboard, dividing it into three mono-zones: **1**-**4**, **5**-**8**, **9**-**12**. Every mono-zone has an individual smart glissando controlled by the sequence and strength of pressing the group's sensors.

Three mono-synthesizers with rhythmic modulation, usable for a soundtrack to "The Draughtman's Contract 2095".



* 00 — triangle, 10 — saw, 02 — reverse saw, 12 — square.

The tempo for the rhythmic LFO is controlled by tap, MIDI or CV clock — see Synchronizing the LFO's and Arpeggiator's tempo.

A — Closes the LPF.
B — Waveshaper drive.
C — Triangle → Saw.
D — Depth of modulation by rhythmic LFO.

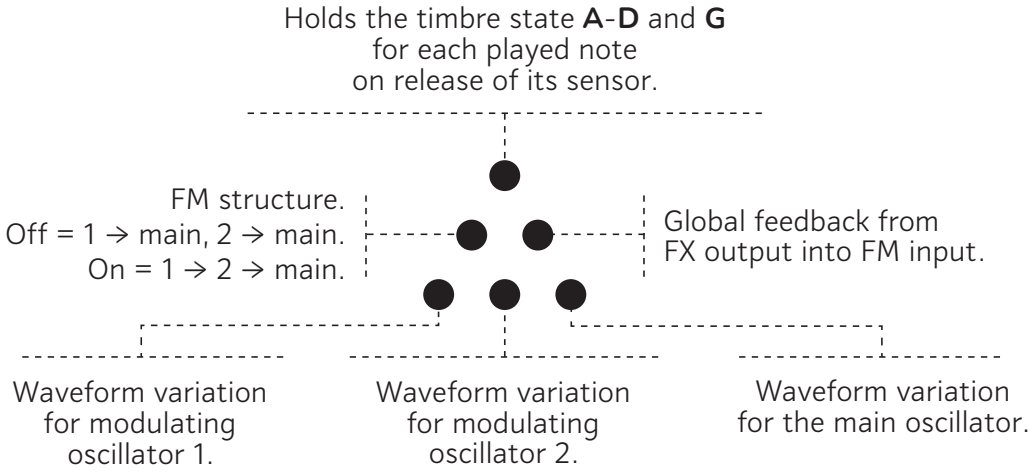
≈ — Tempo of rhythmic LFO.

☼ — LPF resonance.

Gyroscope: X — notes pitch modulation, Y — Echo delay time modulation.

3-voice polyphony. This algorithm uses a unique tri-mono-mode on the **1**-**12** keyboard, dividing it into three mono-zones: **1**-**4**, **5**-**8**, **9**-**12**. Every mono-zone has an individual smart glissando controlled by the sequence and strength of pressing the group's sensors.

Three-operator FM synthesis with independent tuning of the modulating oscillators.



A — Pitch down until oscillators full stop.
B — Level of modulation by oscillator 1.
C — Level of modulation by oscillator 2.
D — Depth of "LYRA-style" frequency modulation.

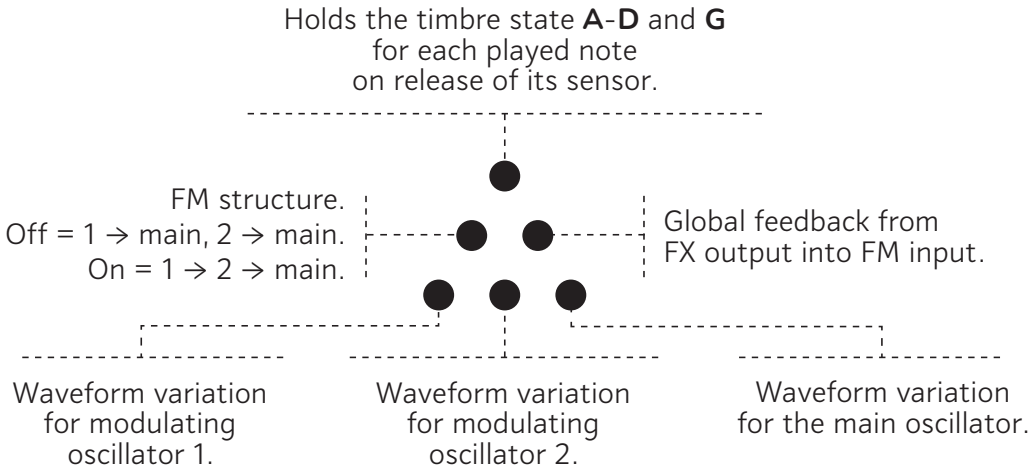
≈ — Frequency for modulating oscillator 1.

☼ — Frequency for modulating oscillator 2.

Gyroscope: X — notes pitch modulation, Y — Echo delay time modulation.

11-voice polyphony.

FM madness controlled by the Gyroscope. Three-operator FM synthesis, where modulating oscillator frequencies are set by the built-in Gyroscope's X and Y axes. With **B** and **C** sensors activated, take TERRA into your hands and tilt it.



A — Pitch down until oscillators full stop.
B — Level of modulation by oscillator 1.
C — Level of modulation by oscillator 2.
D — Depth of "LYRA-style" frequency modulation.

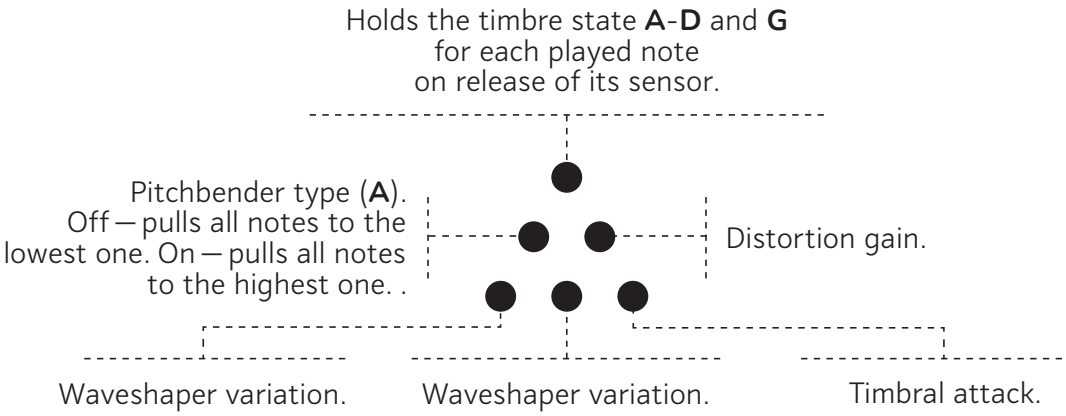
≈ — Depth of Gyroscope's Z-axis effect on the main oscillator frequency.

☼ — HF harmonics of the main oscillator.

Gyroscope: X — frequency of oscillator 1. Y — frequency of oscillator 2. Z — frequency of the main oscillator.

11-voice polyphony.

A sunny afternoon bathed in rays of soft PWM modulation and octave iridescence.



A — The pitchbender pulls all notes to the lowest or highest one.
B — Adds a square waveform.
C — Transitions up in octaves.
D — Depth of PWM modulation.

≈ — LFO frequency for PWM modulation of the triangular waveform.

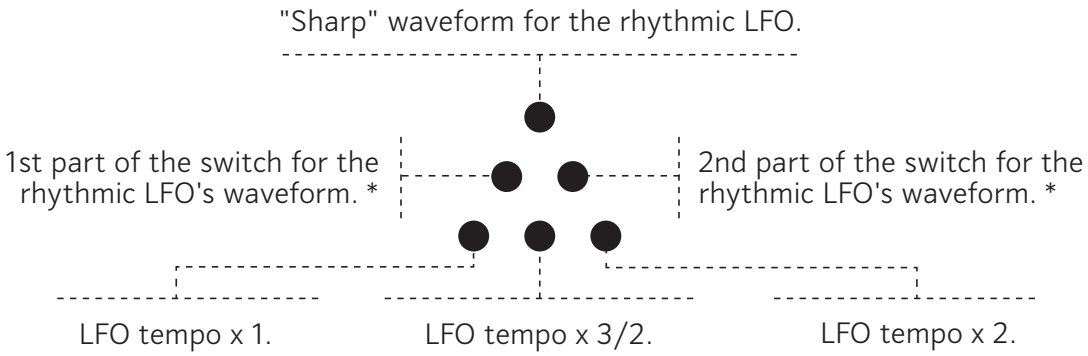
☼ — LFO frequency for PWM modulation of the square waveform.

Gyroscope: X — notes pitch modulation, Y — Echo delay time modulation.

11-voice polyphony.

BASS ALGORITHMS GROUP

Fat FM bass with rhythmic LFO.



* 00 — triangle, 10 — saw, 02 — reverse saw, 12 — square.

The tempo for the rhythmic LFO is controlled by tap, MIDI or CV clock — see Synchronizing the LFO's and Arpeggiator's tempo.

A — Pitchbender, octave down.
B — Harmonics 1.
C — Harmonics 2.
D — Depth of modulation by rhythmic LFO.

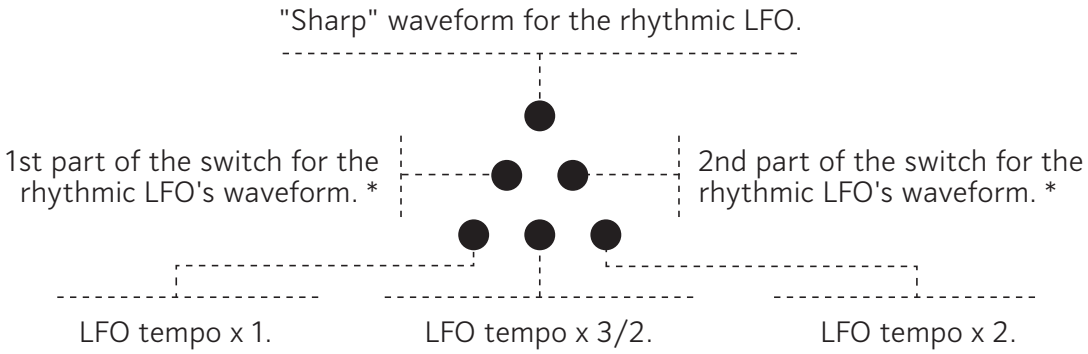
≈ — Tempo of rhythmic LFO.

☼ — Attack brightness.

Gyroscope: X — notes pitch modulation, Y — Echo delay time modulation.

The note keyboard works in mono-mode with a smart glissando controlled by the sequence and strength of pressing the sensors.

"Metallic" FM bass with rhythmic LFO.



* 00 — triangle, 10 — saw, 02 — reverse saw, 12 — square.

The tempo for the rhythmic LFO is controlled by tap, MIDI or CV clock — see Synchronizing the LFO's and Arpeggiator's tempo.

A — Distortion + LPF.
B — Mid-frequency harmonics.
C — High-frequency harmonics.
D — Depth of modulation by rhythmic LFO.

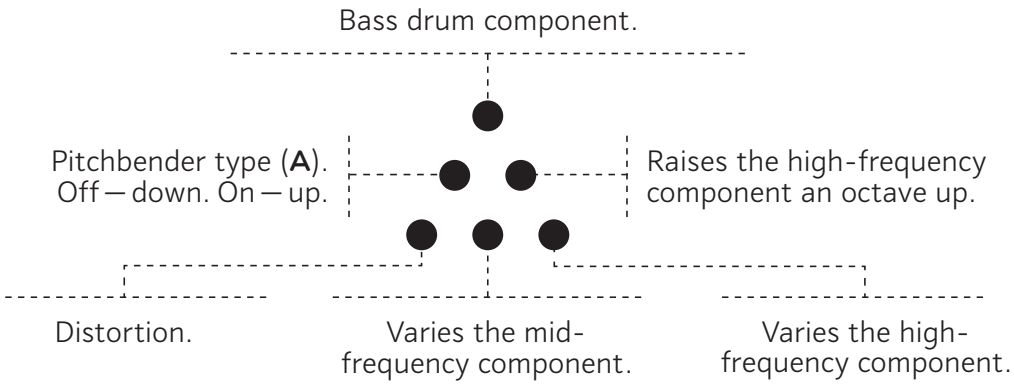
≈ — Tempo of rhythmic LFO.

☼ — Attack brightness.

Gyroscope: X — notes pitch modulation, Y — Echo delay time modulation.

The note keyboard works in mono-mode with a smart glissando controlled by the sequence and strength of pressing the sensors.

Organ-like FM bass with additive synthesis.



A — Pitchbender.
B — Closes the LPF.
C — HF harmonics.
D — Reverb.

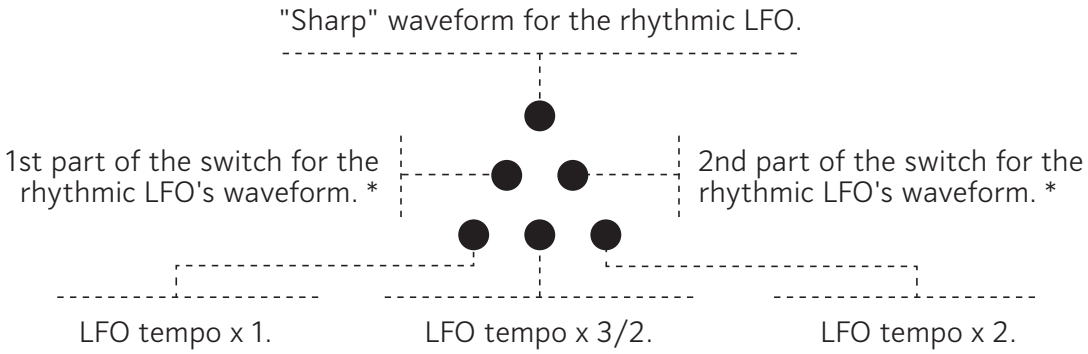
≈ — Mid-frequency component level.

☼ — High-frequency component level.

Gyroscope: X — notes pitch modulation, Y — Echo delay time modulation.

The note keyboard works in mono-mode with a smart glissando controlled by sequence and strength of pressing the sensors.

Wicked square-wave bass with a rhythmic LFO.



* 00 — triangle, 10 — saw, 02 — reverse saw, 12 — square.

The tempo for the rhythmic LFO is controlled by tap, MIDI or CV clock — see Synchronizing the LFO's and Arpeggiator's tempo.

A — Pitch "falling".
B — Pulse width.
C — Volume envelope → LPF frequency.
D — Depth of modulation by rhythmic LFO.

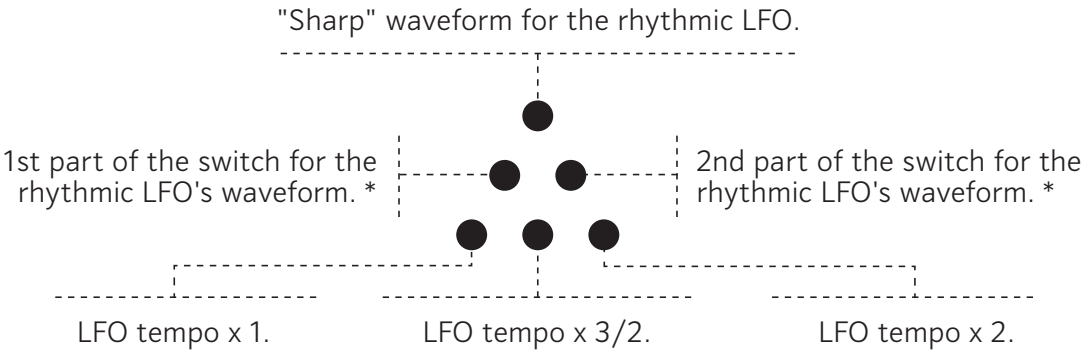
≈ — Tempo of rhythmic LFO.

☼ — LPF frequency.

Gyroscope: X — notes pitch modulation, Y — Echo delay time modulation.

The note keyboard works in mono-mode with a smart glissando controlled by sequence and strength of pressing the sensors.

"Kick drum" bass with rhythmic LFO.



* 00 — triangle, 10 — saw, 02 — reverse saw, 12 — square.

The tempo for the rhythmic LFO is controlled by tap, MIDI or CV clock — see Synchronizing the LFO's and Arpeggiator's tempo.

A — Pitch "falling".
B — Distortion.
C — Fat harmonics.
D — Depth of modulation by rhythmic LFO.

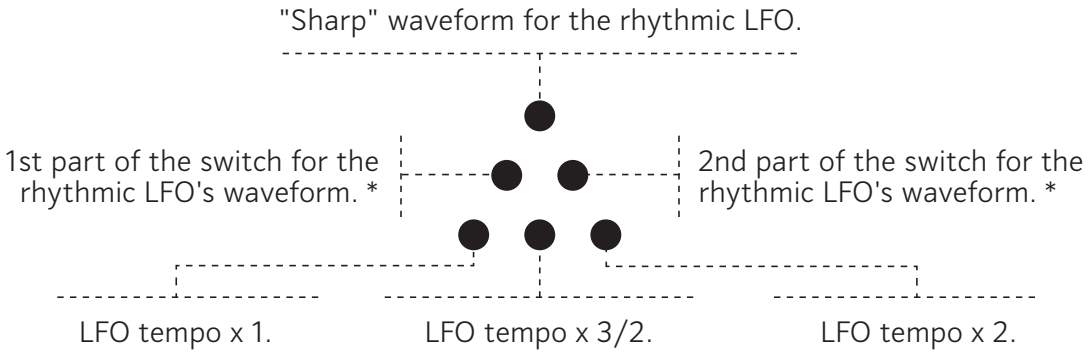
≈ — Tempo of rhythmic LFO.

☼ — Bass Drum attack.

Gyroscope: X — notes pitch modulation, Y — Echo delay time modulation.

The note keyboard works in mono-mode with a smart glissando controlled by sequence and strength of pressing the sensors.

A sawtooth-wave bass with a resonance LPF and distortion with rhythmic LFO.



* 00 — triangle, 10 — saw, 02 — reverse saw, 12 — square.

The tempo for the rhythmic LFO is controlled by tap, MIDI or CV clock — see Synchronizing the LFO's and Arpeggiator's tempo.

A — Modulation of LPF frequency by noise.
B – Distortion.
C — Opens the LPF.
D — Depth of modulation by rhythmic LFO.

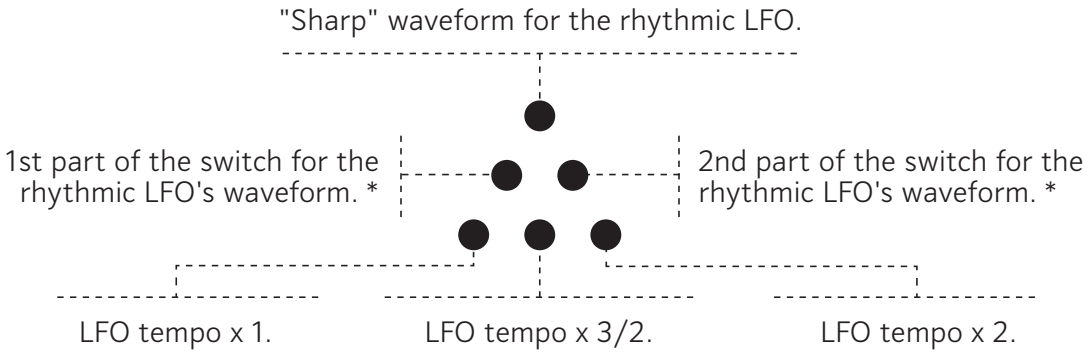
≈ — Tempo of rhythmic LFO.

☼ — LPF resonance.

Gyroscope: X — notes pitch modulation, Y — Echo delay time modulation.

The note keyboard works in mono-mode with a smart glissando controlled by the sequence and strength of pressing the sensors.

Stereo detuned saw bass with rhythmic LFO.



* 00 — triangle, 10 — saw, 02 — reverse saw, 12 — square.

The tempo for the rhythmic LFO is controlled by tap, MIDI or CV clock — see Synchronizing the LFO's and Arpeggiator's tempo.

A — Detune.
B — Triangle → Saw.
C — Opens the LPF.
D — Depth of modulation by rhythmic LFO.

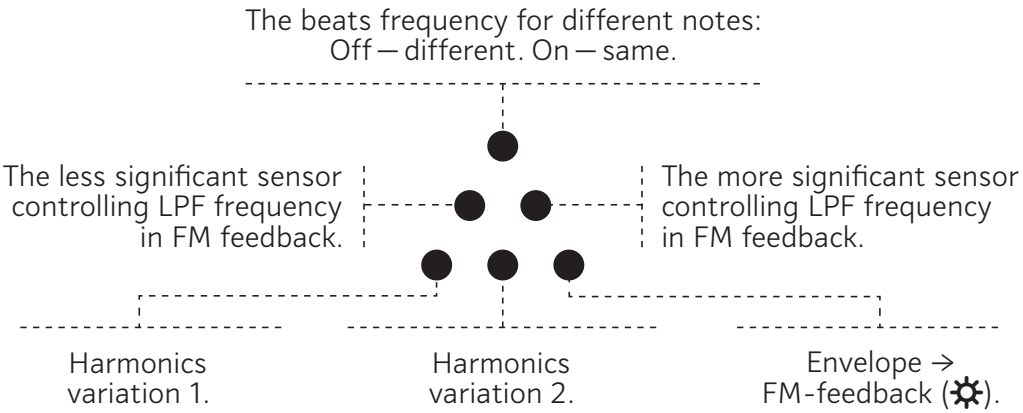
≈ — Tempo of rhythmic LFO.

☼ — LPF resonance.

Gyroscope: X — notes pitch modulation, Y — Echo delay time modulation.

The note keyboard works in mono-mode with a smart glissando controlled by the sequence and strength of pressing the sensors.

A complex "detuned" bass with a multitude of parameters.



A — Pitch down until full stop.
B — Waveshaper.
C — Closes the LPF.
D — FM-feedback.

≈ — Detune.

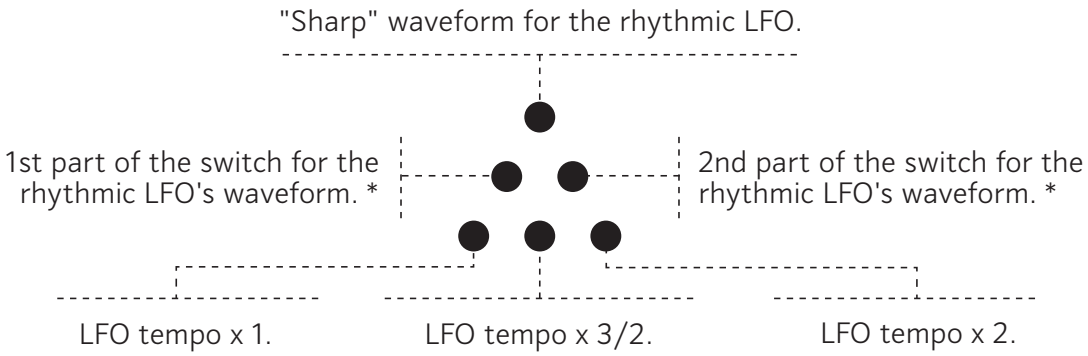
☼ — Level of effect of the envelope on FM-feedback (with "Envelope → FM-feedback" on).

Gyroscope: X — notes pitch modulation, Y — Echo delay time modulation.

The note keyboard works in mono-mode with a smart glissando controlled by the sequence and strength of pressing the sensors.

SOLO ALGORITHMS GROUP

"Organ" arpeggiator with noise modulation.



* 00 — triangle, 10 — saw, 02 — reverse saw, 12 — square.

The tempo for the rhythmic LFO is controlled by tap, MIDI or CV clock — see Synchronizing the LFO's and Arpeggiator's tempo.

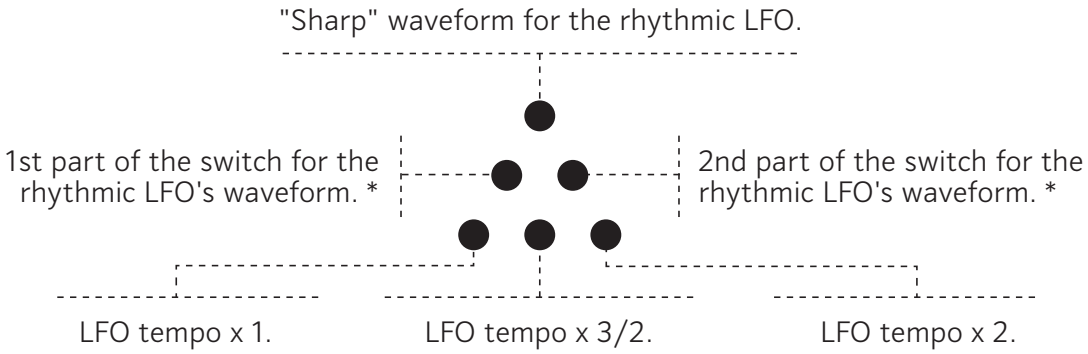
A — An octave-up pitchbender + modulation by noise.
B — Adds an octave down.
C — Adds an octave up with harmonics.
D — HF harmonics.

≈ — Tempo of rhythmic LFO.

☼ — Arpeggiator pattern (see Arpeggiator Patterns tables).

Gyroscope: X — notes pitch modulation, Y — Echo delay time modulation.

"Synthi" arpeggiator with noise modulation.



* 00 — triangle, 10 — saw, 02 — reverse saw, 12 — square.

The tempo for the rhythmic LFO is controlled by tap, MIDI or CV clock — see Synchronizing the LFO's and Arpeggiator's tempo.

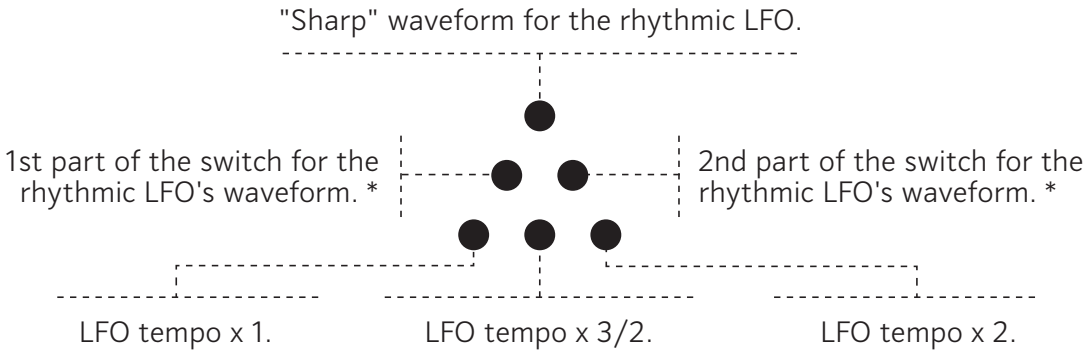
A — Modulation by noise.
B — Adds an octave down.
C — Wavefolder.
D — Triangle → Saw.

≈ — Tempo of rhythmic LFO.

☼ — Arpeggiator pattern (see Arpeggiator Patterns tables).

Gyroscope: X — notes pitch modulation, Y — Echo delay time modulation.

"Resonance" arpeggiator with reverb.



* 00 — triangle, 10 — saw, 02 — reverse saw, 12 — square.

The tempo for the rhythmic LFO is controlled by tap, MIDI or CV clock — see Synchronizing the LFO's and Arpeggiator's tempo.

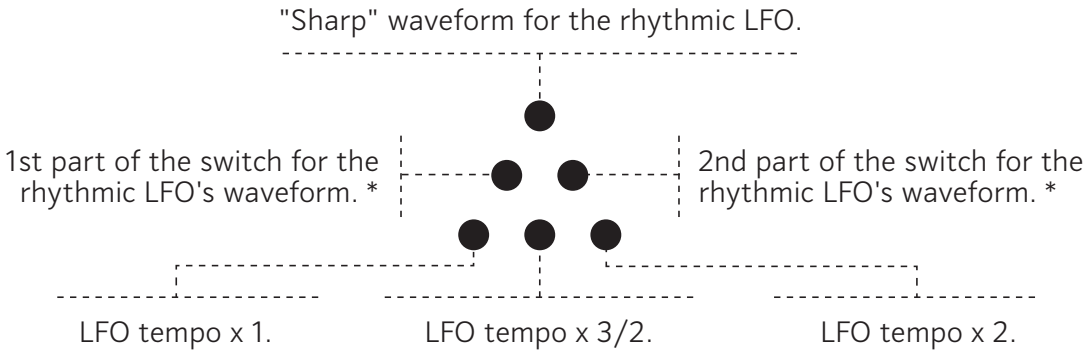
A — Reverb.
B — Adds an octave down.
C — Opens the LPF.
D — Triangle → Saw.

≈ — Tempo of rhythmic LFO.

☼ — Arpeggiator pattern (see Arpeggiator Patterns tables).

Gyroscope: X — notes pitch modulation, Y — Echo delay time modulation.

"Metallic" arpeggiator with reverb and distortion.



* 00 — triangle, 10 — saw, 02 — reverse saw, 12 — square.

The tempo for the rhythmic LFO is controlled by tap, MIDI or CV clock — see Synchronizing the LFO's and Arpeggiator's tempo.

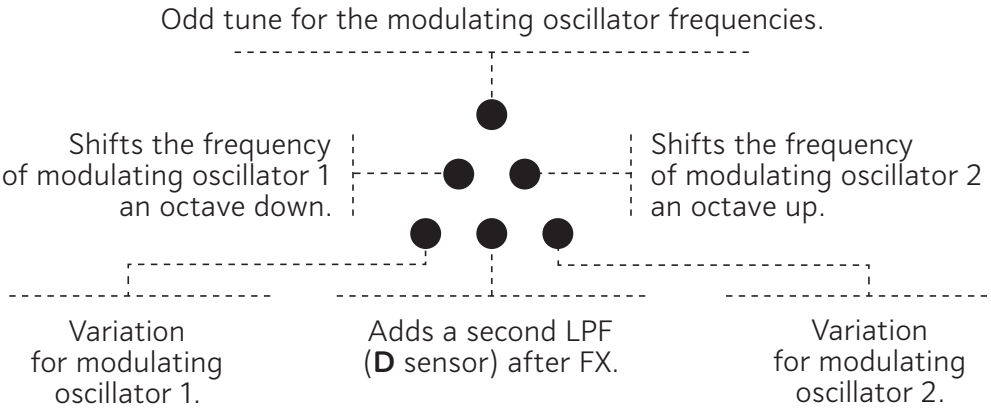
A — Reverb + Distortion.
B — Shifting the modulating oscillator 1 an octave down.
C — Shifting the modulating oscillator 2 an octave up.
D — Depth of FM modulation.

≈ — Tempo of rhythmic LFO.

☼ — Arpeggiator pattern (see Arpeggiator Patterns tables).

Gyroscope: X — notes pitch modulation, Y — Echo delay time modulation.

A "Soft Solo" with shades of nostalgia for the lost faith in Cosmic Space... also with noise modulation and distortion.



A — Modulation by noise.
B — Modulation by oscillator 1.
C — Modulation by oscillator 2.
D — Closes the LPF.

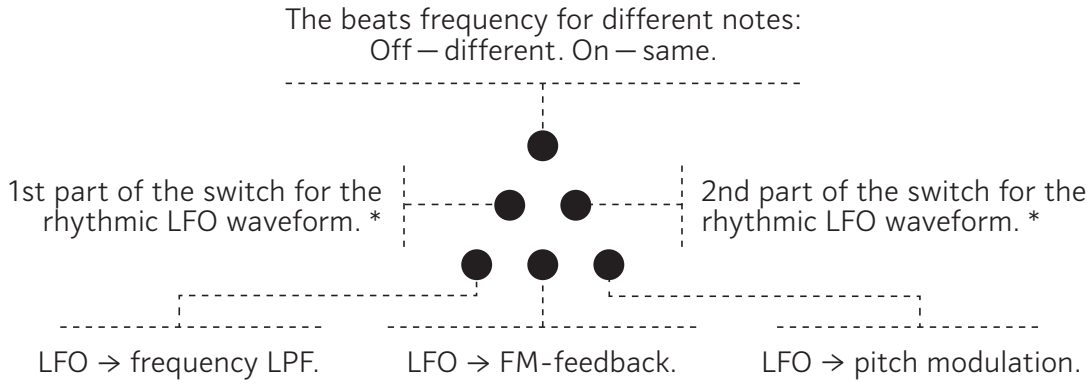
≈ — Feedback from FX out into FM-system's input.

☼ — Distortion drive.

Gyroscope: X — notes pitch modulation, Y — Echo delay time modulation.

The note keyboard works in mono-mode with a smart glissando controlled by the sequence and strength of pressing the sensors.

"LFO Solo" with shades of faith in Cosmic Space restored! Also comes with detune and strange feedbacks.



A — Harmonics 1.
B — Harmonics 2.
C — Closes the LPF.
D — FM-feedback.

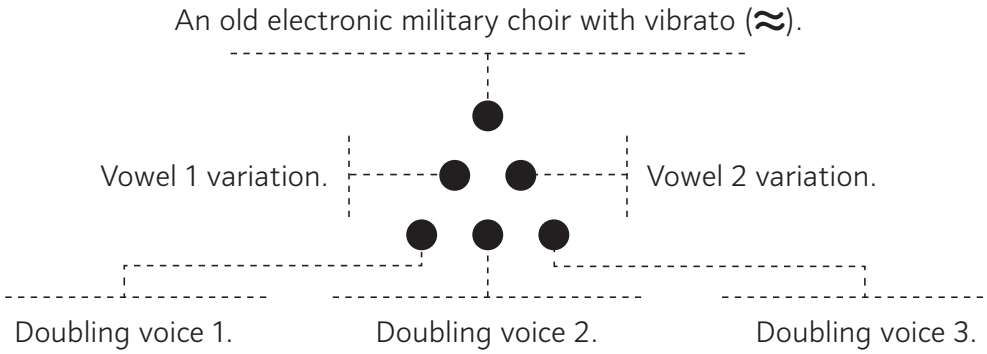
≈ — LFO frequency.

☼ — Detune.

Gyroscope: X — notes pitch modulation, Y — Echo delay time modulation.

The note keyboard works in mono-mode with a smart glissando controlled by the sequence and strength of pressing the sensors.

"Electrons singing" — a formant voice synthesizer.



A — Noise.
B — Vowel 1.
C — Vowel 2.
D — La-la-la.

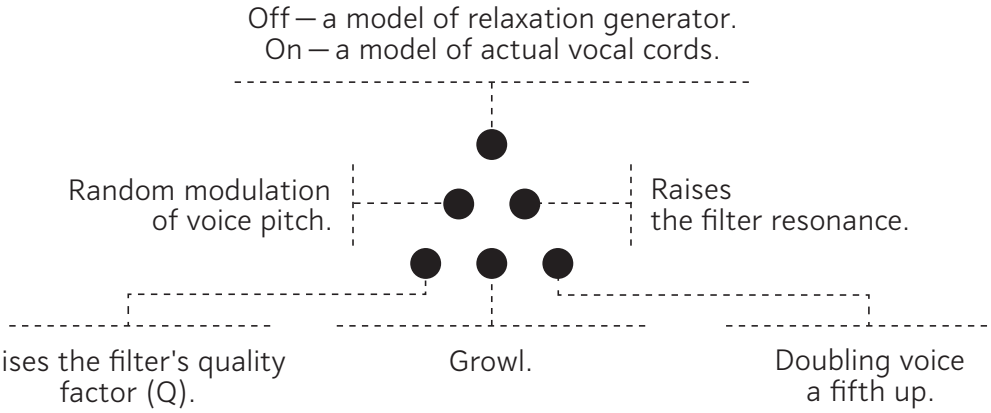
≈ — Vibrato frequency.

☼ — Age and gender of the electrons.

Gyroscope: X — notes pitch modulation, Y — Echo delay time modulation.

The note keyboard works in mono-mode with a smart glissando controlled by the sequence and strength of pressing the sensors. The "old electronic military choir" mode has 5 voices of polyphony.

"Voder" is a reconstruction of the voice synthesizer created by Homer Dudley at Bell Labs in 1939. This algorithm is our way of connecting with the source of electronic synthesis. We invite you to read a collection of unique historical documents on the exploration and modeling of the human vocal apparatus.



+ - + - is not tunable and only reacts to pressing singular or neighboring sensors, allowing for intervals: octave down, fifth down, fourth down, second up, fourth up, fifth up, octave up. Also changes the note pitch after pressing the sensor.

A — Vibrato depth.
B — Pitchbend down.
C — Pitchbend up.
D — Noise.

The note keyboard in this mode functions as a filter bank and is not tunable.
It's set up as follows:

1. Staccato sound
2. 0-225 Hz
3. 225-400 Hz
4. 450-700 Hz
5. 700-1000 Hz
6. 1000-1400 Hz
7. 1400-2000 Hz
8. 2000-2700 Hz
9. 2700-3800 Hz
10.3800-5400 Hz
11. 5400-7500 Hz
12. Trill consonant

≈ — Vibrato frequency.

☼ — Voice pitch.

Gyroscope: X — notes pitch modulation. Y — Echo delay time modulation.

Somewhere deep inside this algorithm, there's a heart beating.

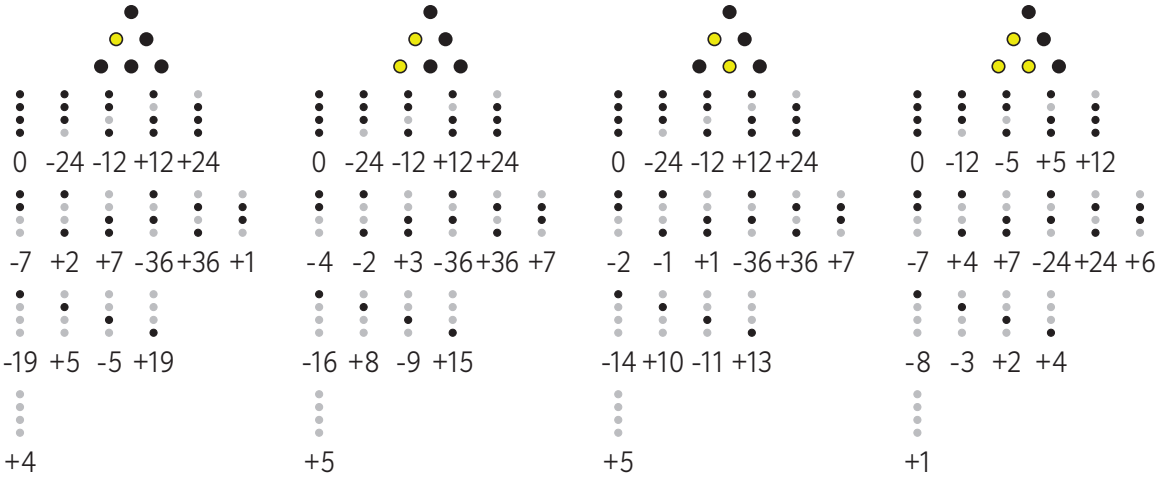
TABLES

FACTORY PRESETS FOR

The main factory presets are stored in this bank.

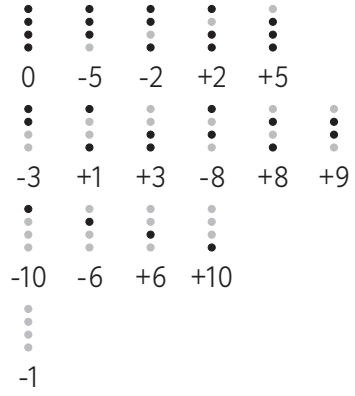
engages a 'just intonation' variation of the current setting.
All factory presets can be changed and written over.

The main factory preset settings in semitones:

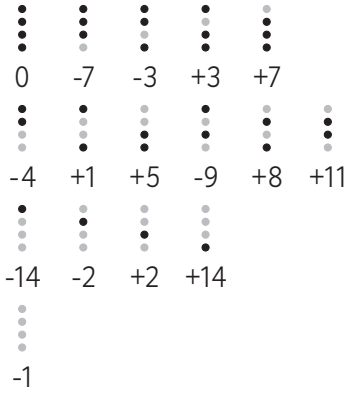


There are also additional Pitch Shifter factory presets made for experimental and microtonal scales. These are used in general presets 11 and 12 in the 1st and 2nd banks.

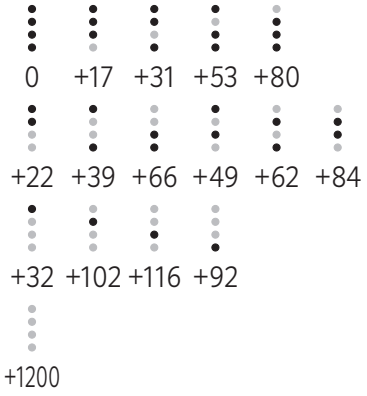
5-tone equal temperament preset.
One step in this table equals 240 cents, or one fifth of an octave:



7-tone equal temperament preset.
One step in this table equals 171.4 cents, or one seventh of an octave:



Together with corresponding **1**-**12** tuning it creates Harry Partch's 43-tone scale:
Pitch in cents.



Here you can find additional information about Harry Partch's scale.
The other presets are empty (i.e. they do not affect note pitches).

ARPEGGIATOR PATTERNS

Patterns change sequence when turning the ≈ knob.

1 — in the order the notes are played
2 — up
3 — up stereo
4 — up + octave up
5 — up + octave up stereo
6 — down
7 — down stereo
8 — down + octave down
9 — down + octave down stereo
10 — up & down
11 — up & down stereo
12 — up & down + octave up & down
13 — up & down + octave up & down stereo

MIDI CONTROLLER ASSIGNMENT OF TERRA'S SENSORS

A — CC16 **1** — CC20 **5** — CC24 **9** — CC28 PL — CC102 ◷ — CC106
B — CC17 **2** — CC21 **6** — CC25 **10** — CC29 L — CC103 ✕ — CC107
C — CC18 **3** — CC22 **7** — CC26 **11** — CC30 ≈ — CC104
D — CC19 **4** — CC23 **8** — CC27 **12** — CC31 ☼ — CC105

See MIDI Output section for details.

TECHNICAL CHARACTERISTICS

SYNTHESIS ALGORITHMS	32
POLYPHONY	1–12 VOICES (DEPENDING ON THE ALGORITHM)
PRESETS	96
PITCH SHIFTER PRESETS	24
LINE OUT	L, R, TS/TRS 1/4-INCH / 6.35 MM JACKS
MAXIMUM LINE OUTPUT SIGNAL	13 V PEAK-TO-PEAK
NOMINAL LINE OUTPUT SIGNAL	~1.5 V (VOLUME 100%)
HEADPHONE OUTPUT	TRS 1/4-INCH / 6.35 MM JACK
HEADPHONES IMPEDANCE	6–64 OHMS
CV-CLOCK INPUT VOLTAGE	3–15 V
POWER SUPPLY VOLTAGE	DC 12 V *
CONSUMPTION CURRENT	0.2 A
DC JACK	5.5X2.1 MM, "+" IN CENTER
DIMENSIONS	405X365X57 MM
WEIGHT	~2.2 KG

* TERRA comes with a high quality power supply. If it gets lost, use a high-quality modern switched-mode power supply with 12 V output voltage, at least 0.4 A maximum current, 5.5x2.1 mm DC jack, center "+".

WHAT'S INCLUDED:

TERRA — 1 pc.
Power supply — 1 pc.
CV clock adapter (DIN5 — 3.5 mm mini-jack) — 1pc.
Short interface reference manual — 1 pc.
On-table mounting pads — 4 pcs.

CREDITS

Andrey Lens — development for wooden body plans and manufacturing technology.
Andrzej Slovik — manufacture organization and control.
Denis Manakov — court philosopher.
Dmitriy Zakharov — adjustments and control.
Grzegorz Lacek — organization, sales, management and communications.
Grzegorz Lelonek — wooden body manufacture.
Evgeniy Aleynik — legal support.
Malgorzata Marcinovska — CEO.
Marta Lacek — communications and sales.
Maxim Manakov — programming, sound design, PCB layout.
Nastia Azartsova — drawing the interface panel design.
Regina Volkova — management, communications, website, editing the manual.
Runa Kreimer — idea, design.
Thomas Lundberg — communications, utopian linguist, proofreader.
Valery Zaveryaev — manual design and layout.
Victor Grigoryev — mechanical assembly.
Vitaly Zhidikov — sales and management.
Vlad Kreimer — concept, sound design, interface, visual design, circuitry, construction, programming, DSP, audio, video, performance.
Vladimir Kornienko — translation for the English manual.
Vyacheslav Grigoryev — supply and manufacturing.

www.somasynths.com
Vlad Kreimer, 2022

Manual version 1.4

2022. Designed in Russia