

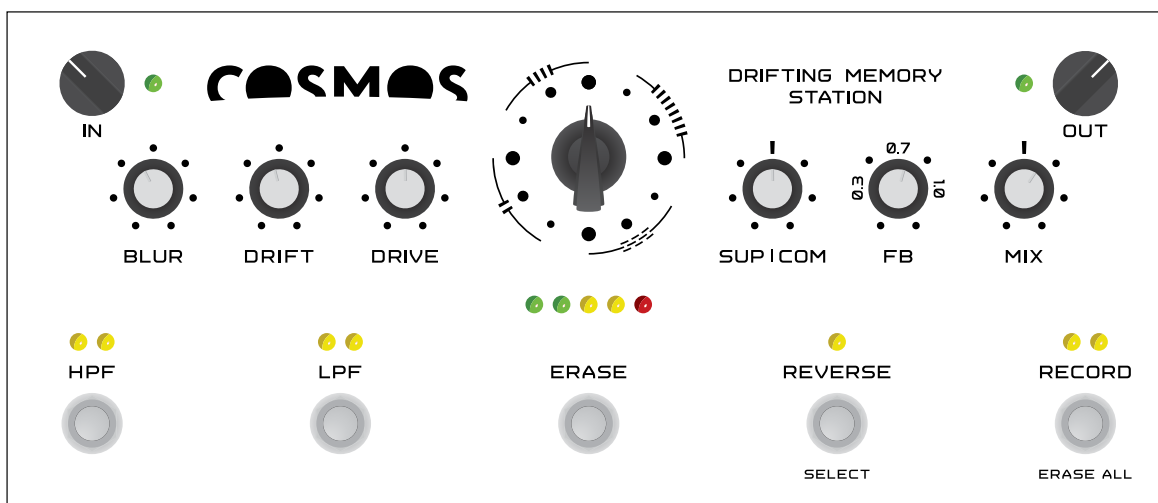


COSMOS

USER
MANUAL



CONCEPT



COSMOS is a drifting memory station designed to work with meditative states through music. The design of the controls, functions and generated soundscapes are intended to evoke, in both performer and listener, states and experiences inherent in meditation, such as limitless space, fluidity, spontaneous development, presence, the ability to hear, tranquility, the experience of subtle harmony and happiness enveloping the whole world.

The controls and functions were carefully selected and tuned in such a way that the performer can remain as focused as possible on their music and inner experiences, with minimal distraction from interactions that require the inclusion of the superficial rational mind, which inevitably leads to falling out of the meditative state.

From a functional point of view, COSMOS is a large array of sound memory, in which recorded sounds undergo constant recombinations, spontaneously generating an ever-changing soundscape. This is achieved in three ways – by a mathematical shift based on the relationships between large prime numbers (the size of all delay lines are different primes), an asynchronous operation of the LFO, and modulation with a slowly changing chaotic signal. As a result, it allows the endless layering and processing of various sounds, as in a looper, but without an intrusive, repetitive loop.

Due to the constant shifts, working with traditional music with a pronounced tempo and rhythm can be difficult. However, for those wishing to use COSMOS in rhythmic music, we have released a special version of the firmware containing a regular looper, but with the unique capabilities of COSMOS. For those interested in polyrhythms, COSMOS in its original form provides excellent opportunities for this, including for working with drums and various percussion instruments.

COSMOS generates rich, fluid and evolving soundscapes perfect for ambient music. Using COSMOS, you can play an entire meditative solo concert while being in a spontaneous flow and without using studio-prepared sequences, backing tracks and other things that can't be a reflection of the "here and now".

Since COSMOS is a memory station, it requires an external sound source. This source can be synthesizer, guitar, voice or any other musical instruments and their combinations hooked up through a mixer. The guitar stomp box design lets you control the effects with your feet, freeing up your hands to play musical instruments or to control other devices. The buttons

are switched with light effort so you can use it with your hands as well, as COSMOS is also intended as a desktop fx module.

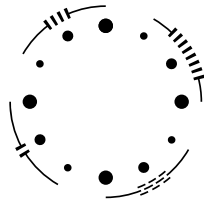
Turning effects on and off makes use of cross-fades, switching algorithms makes use of fade out fade in sequence to prevent the appearance of clicks. When switching algorithms, the contents of the sound memory are transferred to the next algorithm and begin to be processed in a new way. This allows you to turn effects on and off and switch algorithms at any time during the performance, using it as expressive artistic techniques.

COSMOS is assembled with high quality analog and digital components providing high quality sound and musicality. It uses top-class Cirrus Logic audio converters and Burr-Brown's famous operational amplifiers that are highly regarded in the audiophile community. It has a sample rate of 48 kHz with 24 bit resolution, and 32-bit floating point internal digital processing.

The COSMOS software is easily upgradeable via USB flash drive and has several variations, including a traditional looper and a quad version that allows two COSMOS to be used in parallel. This quad system creates four channels of output, and when you connect each channel to its own PA, it creates very interesting possibilities for multichannel live performances.

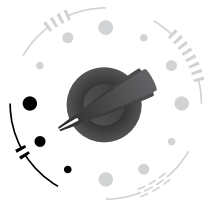
COSMOS was inspired by the early ambient works of Robert Fripp and Brian Eno and the Frippertronic system they developed specifically for this purpose. COSMOS is a further development of these ideas and offers new possibilities for modern performers of meditative music, as well as for those sound designers whose studio work requires rich fluid soundscapes.

ALGORITHMS



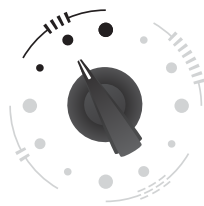
COSMOS has four types of algorithms (indicated by dashed lines), each of which has three variations (indicated by the three solid dots in different sizes).

Each type of algorithm has its own unique method of mixing and shifting sounds. The three variations give different lengths of the delay lines for each of the algorithms. The larger the dot, the longer the delay.



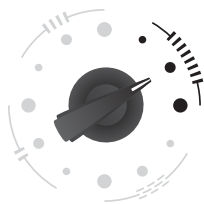
Two delays. Consists of two delay lines, constantly shifting relative to each other.

- The total repetition time is about 2.5 seconds. (due to offsets, hereinafter, the time is indicated approximately)
- The total repetition time is about 9.5 seconds.
- The total repetition time is about 22 seconds.



Four delays. Consists of four delay lines, constantly shifting relative to each other.

- The total repetition time is about 2.5 seconds.
- The total repetition time is about 8.5 seconds.
- The total repetition time is about 11.5 seconds.



Giant reverb. Simulates an echo in a hall several kilometers in size. Due to the enormous size, early reflections sound like individual echoes, which merge very slowly into the finely dispersed noise intrinsic of a reverb.

- Huge hall.
- Super-huge hall.
- Insanely-super-huge hall.



Granular delay. Asynchronous granular stereo-delay.

- Small size of delay and grains.
- Medium size of delay and grains.
- Large delay and grain size, plus an additional central granular delay.

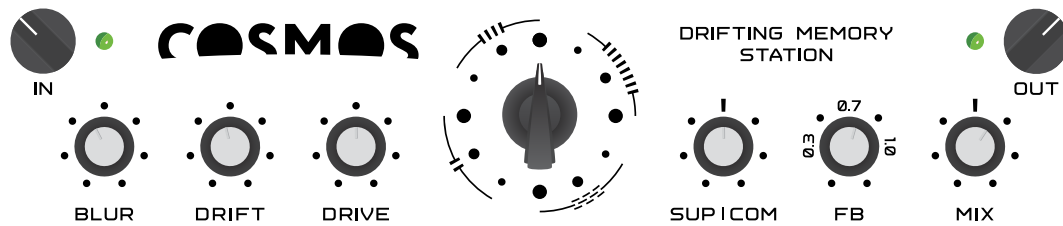
SOUND LEVEL INDICATOR



Shows the volume level of the sound circulating in the delays.
 Green – the volume level is sufficient for proper signal processing.
 Yellow – maximum volume level without distortion.
 Red – the limiter is triggered, limiting the signal.

In most cases, you should keep the volume level in the green-yellow part of the range. Due to the high-quality sound path, even at a very low volume level, when the indicator does not light up at all, the sound will remain clear and beautiful, until it completely disappears. Also, a constantly lit red indicator LED does not mean that the sound is corrupted. Instead of the harsh distortion inherent to digital clipping, you will hear a soft overdrive as on tape recorders. This is due to the built-in limiter, which prevents hard clipping and distortion. You can use delay overload as an artistic effect without fear of harsh digital distortion or clipping.

KNOBS



IN

Adjusts the input level. Set the knob in such a position that the adjacent volume indicator lights up green and does not light up or occasionally light up red. The red LED illuminates when the input A/D converter is overloaded, resulting in harsh digital distortion that cannot be further mitigated by the internal limiter. If the red indicator lights up occasionally, this means that only individual signal peaks are reaching the maximum, which is usually acceptable.

BLUR

In algorithms **||** and **||||** (delays) – adds cross-feedback between delay lines, which leads to a gradual blurring of their content.

In the algorithm **|||||** (reverb), it does nothing.

In the algorithm **≡≡≡** (granular), it modulates the position of the grains with a noise signal.

DRIFT

In algorithms **||** and **||||** (delays) – it modulates the panorama of delays with an asynchronous LFO, whose frequency, in turn, is modulated by a slow chaotic signal.

In the algorithm **|||||** (reverb), it does nothing.

In the algorithm **≡≡≡** (granular), it modulates the positions of grains with an asynchronous LFO, whose frequency, in turn, is modulated by a slow chaotic signal.

DRIVE

Adds gentle distortion to the sound, similar to a guitar overdrive.

SUP|COM

In the middle position marked by the solid rectangle, no effects are applied.

By turning the knob from the midpoint to the minimum (CCW), a suppressor is added. Suppressor is an effect that suppresses recorded sounds with newly arriving ones. In this case, the louder the incoming sound, the stronger the suppression level. The suppressor allows you to automatically replace the contents of the delays when new sounds arrive and play them until the next one arrives. The middle position of the knob corresponds to the switched off suppressor, the minimum one to it fully switched on.

Mid to Maximum – Suppressor off.

Rotating the knob clockwise from mid to maximum (second half of the scale) adds a compressor, with the suppressor off. Compressor is an effect that makes soft sounds louder and loud sounds quieter. The sum of the recorded and incoming signals is used as the compressor control signal. The middle position of the knob corresponds to the switched off compressor, the maximum position corresponds to it fully switched on.

Zero to Mid – Compressor off.

FB

Feedback – the level of delivery of the output signal of the delays to their input. If the value is less than 1.0, the sounds in the delays will fade out. If the value is equal to 1.0, sounds stay at the same level. If the value is greater than 1.0, volume level will increase. In most cases, this knob should be at a position slightly less than 1.0.

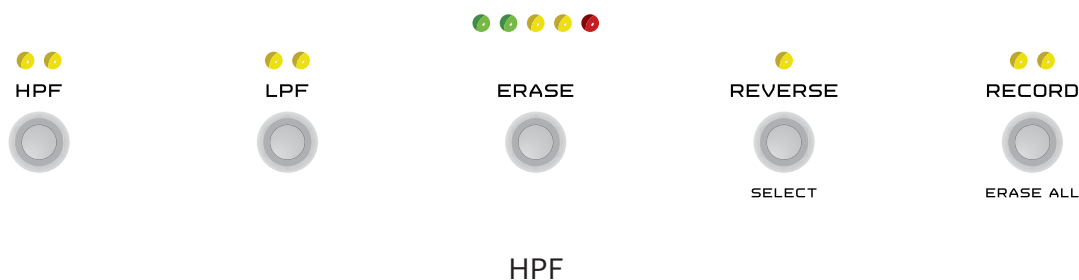
MIX

Determines the balance between incoming and outgoing signals. In most cases, this knob should be set in the middle position where the signals are equal.

OUT

Output signal level. The green LED next to this knob is the power indicator.

BUTTONS



High-pass cutoff filter (high frequencies pass, low frequencies are cut). It has three fixed cutoff frequency settings. To change the frequency, hold down the **HPF** button and press the **REVERSE (SELECT)** button.

The filter status is indicated by two LEDs above it:

- ● – the filter is off.
- ● – minimum cutoff frequency (least filter effect).
- ● – medium cutoff frequency (medium filter effect).
- ● – maximum cutoff frequency (the greatest influence of the filter).

LPF

Low-pass cutoff filter (low frequencies pass, high frequencies are cut). It has three fixed cutoff frequency settings. To change the frequency, hold down the **LPF** button and press the **REVERSE (SELECT)** button.

The filter status is indicated by two LEDs above it

- ● – the filter is off.
- ● – the minimum cutoff frequency (the greatest influence of the filter).
- ● – medium cutoff frequency (middle filter effect).
- ● – maximum cutoff frequency (least filter effect).

ERASE

Erases sounds recorded in delay lines. To instantly clear all memory, hold down the **ERASE** button and press the **RECORD (ERASE ALL)** button.

REVERSE





Switches on reverse playback.

RECORD

Enables writing to the device memory. If this button is not pressed, the sounds recorded in the device's memory are played back and can be modified by the built-in effects, but new incoming sounds are not recorded to the memory. In this case, the incoming sounds are still mixed with the recorded sounds and fed to the output of the device. Record Off is good for soloing over recorded sounds, which are used as background in this case.

The record function has four modes of operation. To switch modes, hold down the **RECORD** button and press the **REVERSE (SELECT)** button.

The recording status is indicated by two LEDs above the button:

-  – recording is off.
-  – records to the first group of delays of current algorithm.
-  – records to the second group of delays of current algorithm.
-  – records to all delays of the current algorithm. (This is the main mode, it is here that all the magic of COSMOS is revealed)

In algorithms **||** and **||||** (delays), if you press and hold the **RECORD** button for more than five seconds, the playback speed of the delay's content will be slowed down twice. To return to normal mode, press the **RECORD** button again and hold it for more than five seconds.

ADDITIONAL FUNCTIONS

MONO MIX

Simultaneously pressing the HPF+ERASE+RECORD buttons will sum the signals from the Left and Right inputs and send them to both channels. This mode allows using the stereo input as a mixer for two mono sources. To return to the normal stereo input mode, you need to switch COSMOS off and on again.

NOISE GATE

COSMOS has a noise gate on the inputs that keeps the loop clean during long performances when you keep RECORD ON active for extended periods. Due to very subtle sounds that may appear from silence, the noise gate can eat the attack of the sound. If you need to make the noise gate more sensitive (lowering the noise floor by a factor of 10) simultaneously press HPF+LPF+ERASE buttons. To return to the normal noise gate sensitivity, you need to switch COSMOS off and on again.

FINE ADJUSTMENT OF 1.0 POINT OF THE FEEDBACK KNOB

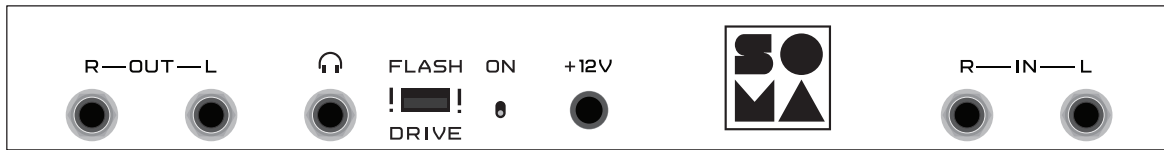
It's important to know where the unity feedback gain point on the scale exactly is.

At this point, the buffer's content remains unchanged. (However, we recommend keeping FB slightly below 1.0 to give headroom for new incoming sounds)

It's possible to check and adjust the 1.0 point. To do this, please follow these steps:

- Turn on COSMOS while holding the HPF button. COSMOS will enter its diagnostic mode where you can check different functions depending on the dial position.
- Set the dial to **||||** middle dot.
- Turn the FB knob until the REVERSE LED lights up. This is the current position of the 1.0 point. At the factory, we set it on the dot between 1 and 0. This is the recommended setting.
- For fine adjustment, set the FB knob to the desired position of unity gain and press the RECORD button. COSMOS will be recalibrated and hold the value after power off.

REAR PANEL



R-OUT-L Balanced stereo output. If the jack is plugged into only one of the outputs, the device automatically creates a mono mix, thus preserving the full sound pan of COSMOS.

 – headphones output.

FLASH DRIVE – USB 2.0 port for flash drives only, for firmware updates. Do not connect anything other than a standard flash drive! Do not connect to a computer! Incorrect usage can damage COSMOS and voids the factory warranty!

ON – power switch.

Connector **+12V** – power input DC 12 volts, 0.5 ampere, center – plus. Use only the power supply supplied with the device! If it fails, it can be replaced with a high-quality modern switching power supply with an output voltage of 12 volts, the center is plus and an output current of at least 0.5 amperes (more is OK). The power supply must have a wide AC input voltage range of 100-240 volts. Such power supplies have excellent output voltage stabilization required for the device. Do not use COSMOS with nonstabilized voltage from transformer power supplies. It can lead to damage to the device, which is not covered by the warranty repair!

R-IN-L stereo input of the device. Can take both TS and TRS cables. If the jack is plugged into only one of the inputs, the device will automatically duplicate the signal to the second channel. In most cases, it makes no sense to feed a stereo signal, as it will still be split into delay groups and will lose the stereo effect. However, this can make sense if you intentionally want different signals to go to different delay groups. The left and right input channels are assigned to different delay groups. This also makes sense in the alternative firmware that contains a traditional stereo looper.

To connect a mono signal, plug a mono jack into any of the device inputs (the second input will receive the same signal automatically).

FIRMWARE UPDATE

COSMOS firmware is easily upgradable. Several firmware versions are available, providing different algorithms and their variations.

To download new firmware:

1. Download the firmware from **somasynths.com** → **INSTRUMENTS** → **COSMOS** → **FIRMWARE**
https://somasynths.com/cosmos_firmware

2. Save the firmware in the root directory of the flash drive. The file system of the flash drive must be FAT32. We recommend that you do not use high-capacity flash drives. 1-32 GB flash drives are ideal. Do not put several firmware versions in the root directory of one flash drive!

3. Turn off COSMOS.

4. Insert the flash drive into the USB port on the rear panel.

5. While holding down the RECORD button, turn on the power switch.

6. The switching of the LEDs above the RECORD button indicates a successful progress of update process.

7. Upon completion of the update process, COSMOS will automatically enter the operating mode, which will be evidenced by the running light on LEDs from left to right, which you see every time you turn on the device.

8. Now the flash drive can be removed.

If the firmware update process fails, the red LED next to the **IN** knob will turn on. If this happens:

- Check the operability of the flash drive.
- Make sure the firmware is placed in the root directory and the file name has not been changed.
- Try another flash drive.
- Try to delete all contents from the flash drive and format it before copying the firmware.

SPECIFICATIONS

Minimum input voltage	0.35 V peak-to-peak
Maximum output voltage at line outputs	11.3 V peak-to-peak
The maximum output voltage at the headphones output.	10.4 V peak-to-peak
Frequency response	10–22000 Hz
Sound memory	44.7 sec
Supply voltage	DC 12 V *
Power connector polarity.	center plus
Current consumption.	0.25 A
Dimensions	342 x 153 x 68 mm
Weight	2.2 kg

* Use only the power supply supplied with the device! In case of failure, it can be replaced with a high-quality modern switched-mode power supply with an output voltage of DC 12 volts, the center is plus and an output current of at least 0.5 amperes (more is fine). The power supply must have a wide AC input voltage range of 100-240 volts. Such power supplies have excellent output voltage stabilization required for the device. It is forbidden to use COSMOS with nonstabilized voltage from transformer power supplies. It can lead to damage to the device, which is not covered by the warranty repair!

CREDITS

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